

THE
Manitoba Bridge and Iron Works

LIMITED

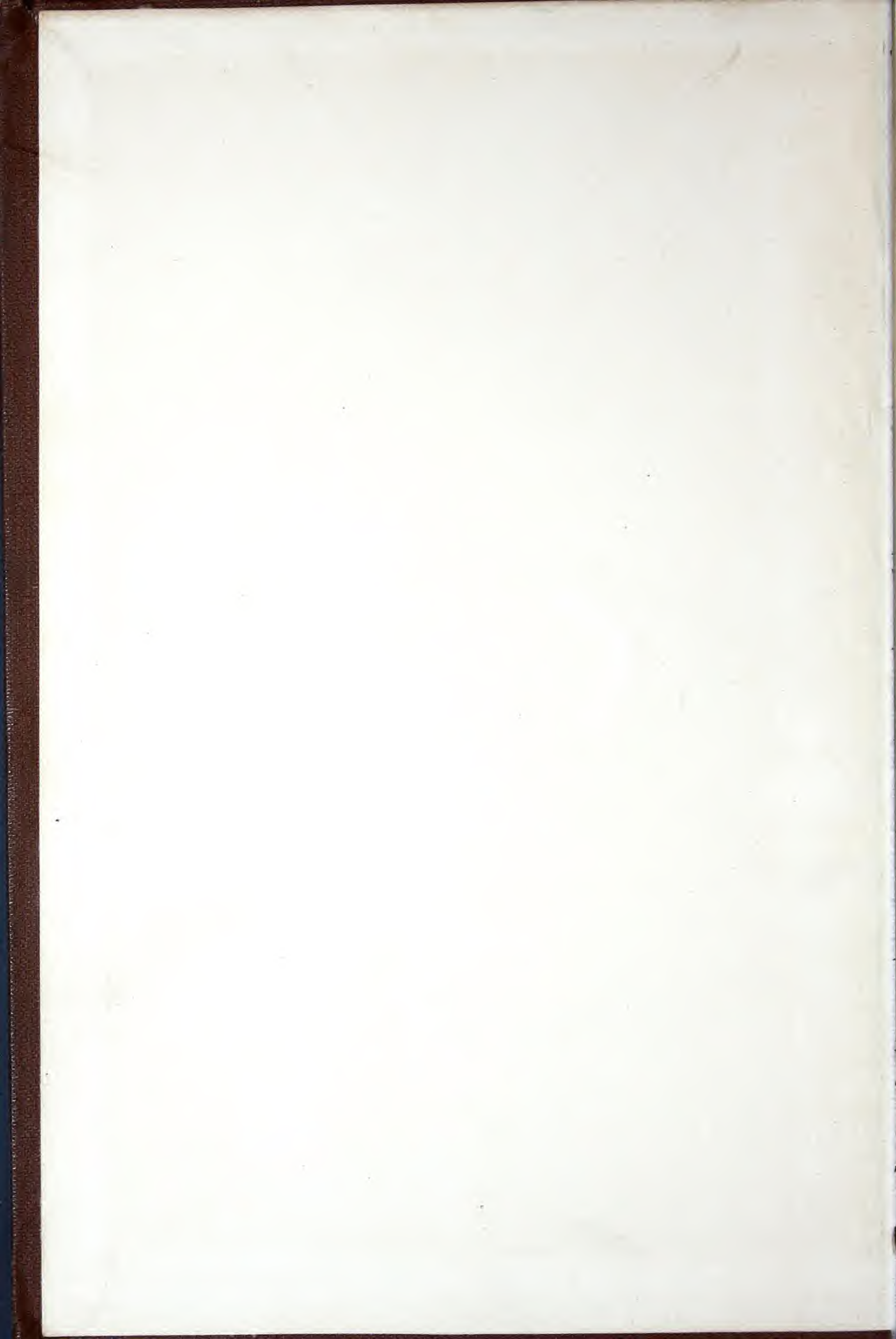
WINNIPEG

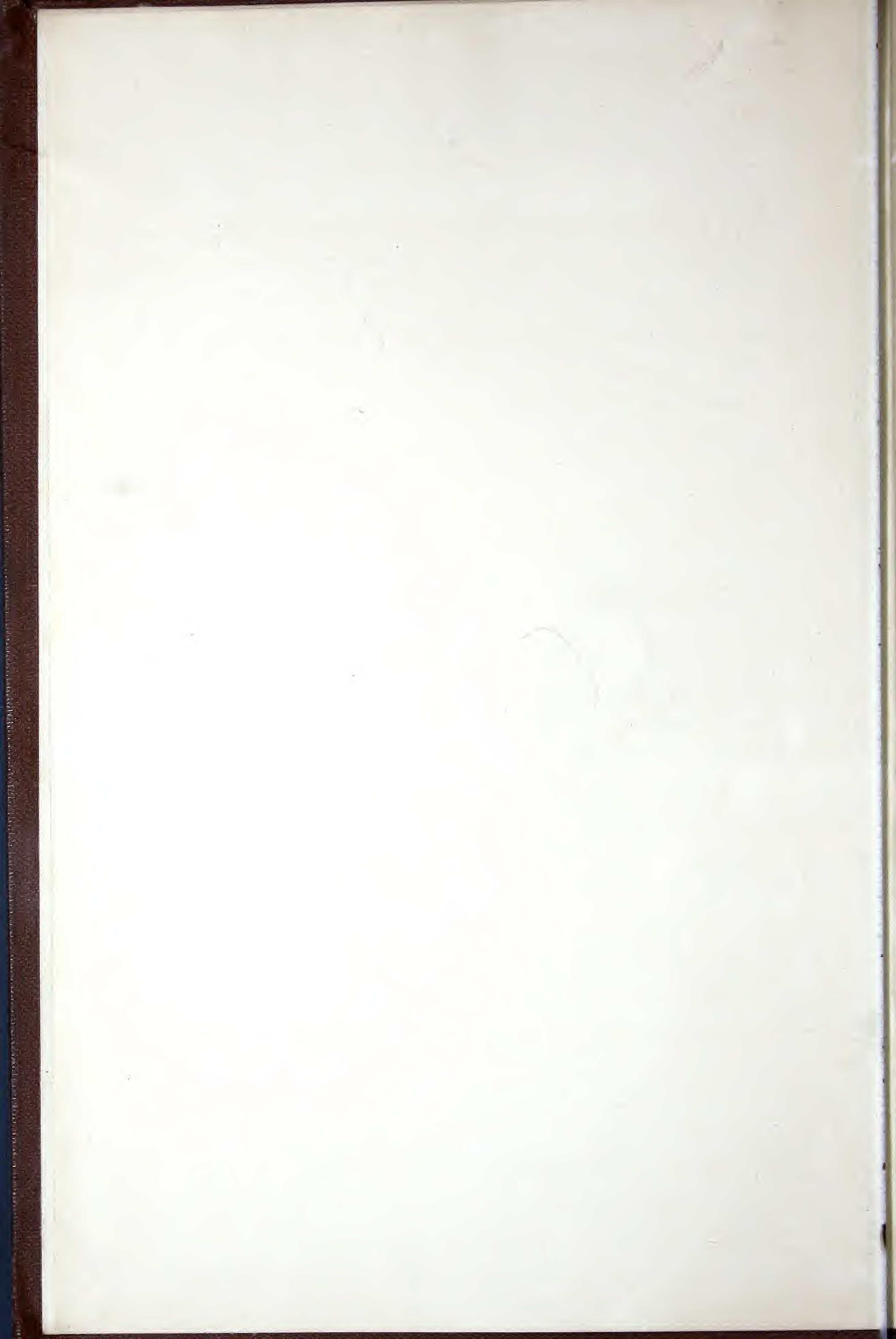
1910

CATALOGUE

OF

STRUCTURAL STEEL AND IRON





CATALOGUE OF
Structural Steel and Iron

—FOR—

Architects, Engineers and Contractors

**STRUCTURAL STEEL AND IRON FOR BUILDINGS
AND BRIDGES**

**COMPLETE POWER TRANSMISSION INSTALLATIONS FOR
GRAIN ELEVATORS, SAWMILLS AND MINES**

PLATE, GENERAL FOUNDRY AND MACHINE WORK

ORNAMENTAL IRON WORK

Standard Rolled Sections of Beams, Angles, Channels, Plates, Tees,
Zees, Bars, Rods, etc., of various weights and lengths up to 60 feet,
always in stock for prompt shipment.

Square, Cold Twisted, Medium Steel Bars, $\frac{1}{4}$ in. to $1\frac{1}{4}$ in. square
up to 32 feet in length for reinforced concrete.

AGENTS IN ALL CITIES AND TOWNS IN WESTERN CANADA

1910

MANITOBA BRIDGE AND IRON WORKS, LIMITED

WINNIPEG, MANITOBA

Established 1903

ENGINEERS

MANUFACTURERS

CONTRACTORS

MERCHANTS

ANNOUNCEMENT

MANY changes have taken place in the past few years in the structural steel business, and these changes have been brought about by more careful consideration and greater experience in designing, improved methods in the manufacture and fabrication of steel and particularly by the enormous increase in the demand and use of steel and iron in building construction throughout the country. It is not so long ago since a steel frame for a roof or building was considered an unnecessary expense and almost a curiosity, if not an experiment, as wood had been altogether used. Now, however, wooden framing is false economy, and denotes either a temporary structure with high insurance, or a lack of resources.

A gradual improvement in design and construction has taken place, and now, practically all large and many small manufacturing plants and other industrial buildings, hotels, apartment houses, churches, schools, etc., are designed so that a maximum amount of steel and a minimum amount of timber is used. The modern construction being a combination of steel, brick or stone and concrete; a building having a steel frame or skeleton, brick or stone curtain walls and concrete floors and roof representing the highest type of and most durable construction yet devised. This is proved by the fact that practically all the great office and manufacturing buildings in such centers as New York, Chicago, Boston, Montreal, Toronto, and in our own City of Winnipeg, are so designed. In these cities no expense is spared to produce the best results, and if any better combination of structural materials was known it would assuredly be adopted.

To meet the great increase in the demand for structural products of all kinds in Western Canada, we have recently increased the capacity of our already large plant by the erection of the largest and best-equipped structural shop in Canada, west of Toronto, and we expect and hope to outgrow even this addition in the near future.

We have pleasure in forwarding to you this catalogue, which we have endeavored to make as complete and as comprehensive as possible along the lines of structural materials, and while it contains a large amount of information which we feel will be of value and assistance to architects, engineers, builders and others interested in building construction, it by no means covers the ground thoroughly, and we state for your information that we have a very efficient engineering staff whose services are at the disposal of our customers and friends, absolutely without charge, should any information not in this catalogue be required.

We acknowledge with gratitude the very liberal patronage accorded to us at all times, and our entire efforts have been and will be to strictly carry out agreements. By adding to our plant we have endeavored to keep up with the demands of our customers, who now number well up in the thousands and are located in every place of importance in Western Canada.

We endeavor to make our products a standard of workmanship, and we claim to be the pioneers and leaders in the structural steel business in Western Canada. In bridge building and other structural work we can serve you as favorably, promptly and efficiently as any of our competitors.

In order to meet the increasing demand of our merchant business, we are carrying a complete stock and large tonnage of all standard structural shapes as outlined in another section.

We trust that you will find time to look carefully through this catalogue and preserve it for future use.

MANITOBA BRIDGE AND IRON WORKS, LIMITED.
WINNIPEG.

PREFACE

TO ASCERTAIN the cost of any structural steel or iron, we must know the weight, as all costs are based on weights. In this catalogue, various illustrations and tables will be found which will enable any architect or contractor to determine just which sections and weights for the different members in the design can be used to best advantage. It is always advisable to specify standard sections to insure economy of design and prompt shipment.

We carry in stock at all times about 5,000 tons of the various sections such as Beams, Channels, Angles, Plates, Tees, Zees, Bars, Rods, etc., and our experience enables us to select the most suitable sizes, weights and lengths. Our stock is at all times well assorted and covers all the standard sizes and weights of Beams from 3 inches to 24 inches in depth, standard sizes and weights of Channels from 3 inches to 15 inches in depth, also practically all the standard sizes and weights of Angles. This material is in lengths varying from a few feet to 60 feet.

Our stock of plates is very complete and covers material from 8 inches to 96 inches in width, and varying from $\frac{1}{8}$ inch to 1 inch in thickness.

We do not carry a large stock of Zees or Tees, as these sections are rarely used, but we can always supply standard sizes on reasonable notice, when required for special work.

We are now selling steel Bars for reinforcing concrete, either square twisted, or plain, square or round, and we will always carry a stock of assorted sizes $\frac{1}{4}$ inch to $1\frac{1}{4}$ inch, and in lengths up to 32 feet. These Bars are medium steel, manufactured according to manufacturer's standard specifications (see pages 203-205), as now used in all the important engineering works in Canada and America. Bars will be cut to lengths to meet any specification.

We issue a stock list monthly. We will enter your name on our mailing list if you wish to receive it.

This catalogue is not a technical handbook or manual for designers. It is intended for the practical use of Architects, Builders and others interested in Building Construction, and contains illustrations, tables and notes which show the application of structural steel and iron in modern building construction.

In this catalogue, under the several headings, descriptions of the different classes of structural steel and iron will be found as follows:—

BEAMS, GIRDERS, LINTELS, TRUSSES
COLUMNS (Steel, Cast Iron, Pipe, plain and ornamental)
FIRE ESCAPES, STAND PIPES, STEEL AND IRON STAIRS (straight and spiral)
ORNAMENTAL IRON (including Crestings, Finials, Weather Vanes, Heavy Hinges, Railings, etc.)
HIGHWAY BRIDGES
JAIL EQUIPMENT (including Steel Cells, Doors, Window Guards, etc.)
STABLE FITTINGS (including Stall Guards, Stall Posts, etc.)
STEEL DOORS, FIRE SHUTTERS, WINDOW GUARDS, AREA GRATINGS, SIDEWALK DOORS, VAULT AND SIDEWALK LIGHTS.
PACKER'S EQUIPMENT (including Overhead Track and Fittings, Travellers, Hooks, Tanks, Kettles, etc., etc.)
FUEL CHUTES (all types)
CONTRACTORS' SUPPLIES (including Hoisting Engines, Derricks, Cars, Rails, Buckets, Sheaves, Pile Drivers, etc., etc.)
STEEL TANKS AND TOWERS, STEEL STAND PIPES, STEEL STACKS
STEEL VAULT LININGS AND VAULT DOORS
MISCELLANEOUS (including Anvils, Fire Brick, Man-hole Covers, Sash Weights, Furnace Grates, Joist Anchors, Bolts, Washers of all kinds, etc., etc.)
STEEL BARS (for Concrete Reinforcement)
JOIST AND WALL HANGERS (all patterns)
POST CAPS AND BASES (all patterns)
MISCELLANEOUS TABLES
MANUFACTURERS' STANDARD SPECIFICATIONS (for Steel and Cast Iron)
FREIGHT RATES and CLASSIFICATION
TELEGRAPHIC CODE
GENERAL INDEX
INSTRUCTIONS TO BUYERS

POWER TRANSMISSION MACHINERY AND EQUIPMENT IS COVERED
 BY SEPARATE CATALOGUE

THE MANITOBA BRIDGE AND IRON WORKS, LIMITED

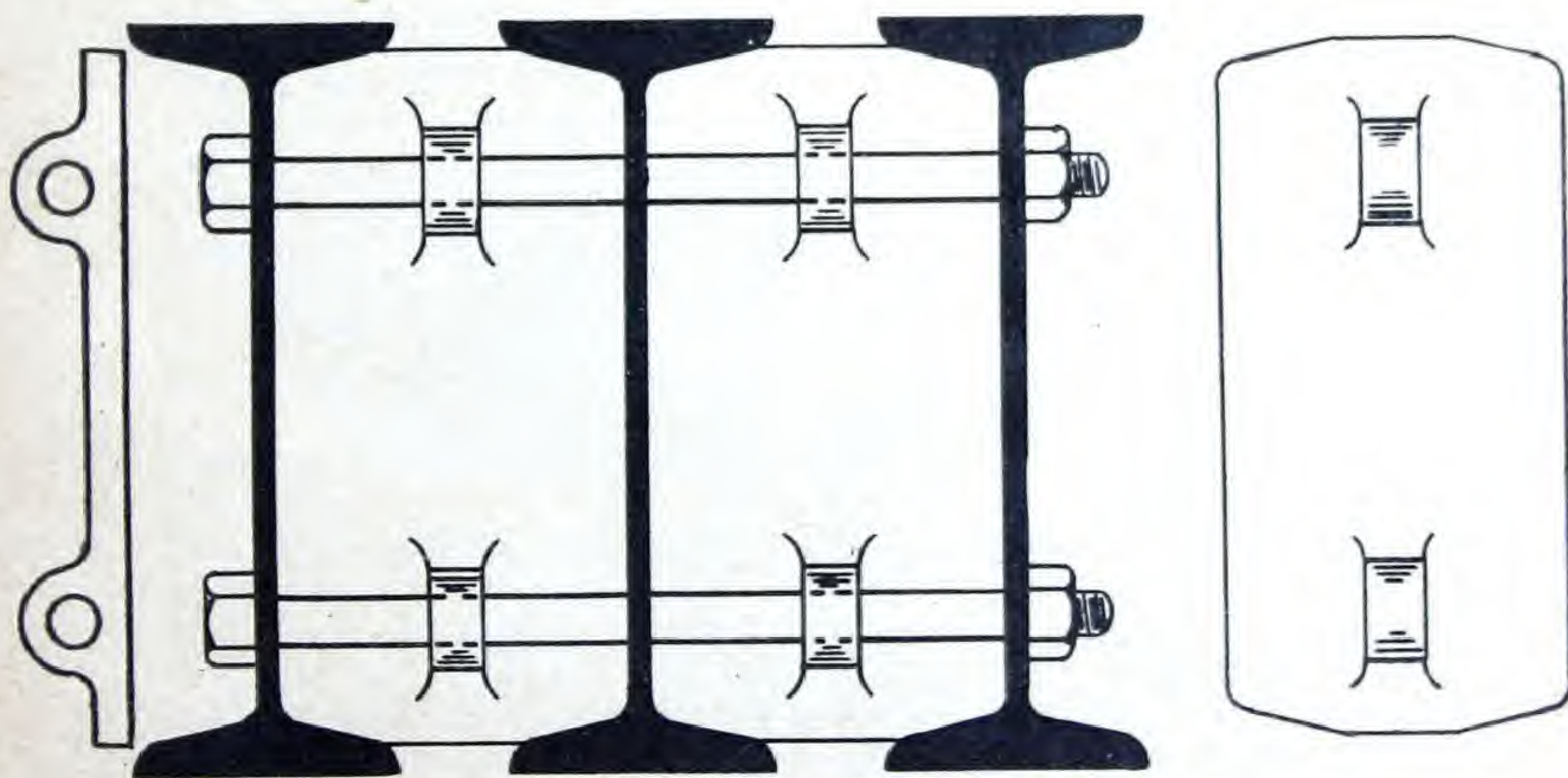
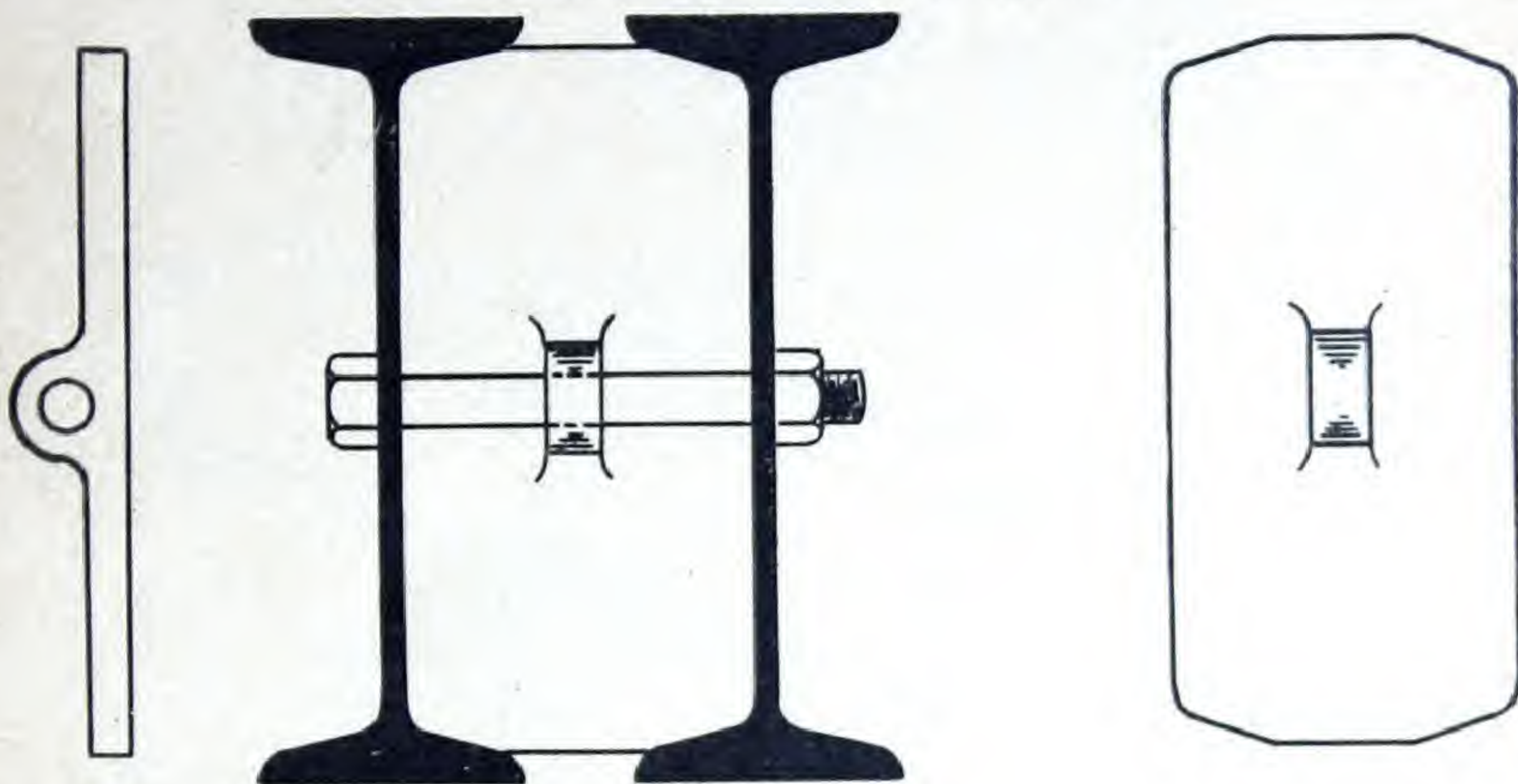
WINNIPEG

1910

Beams, Girders and Lintels

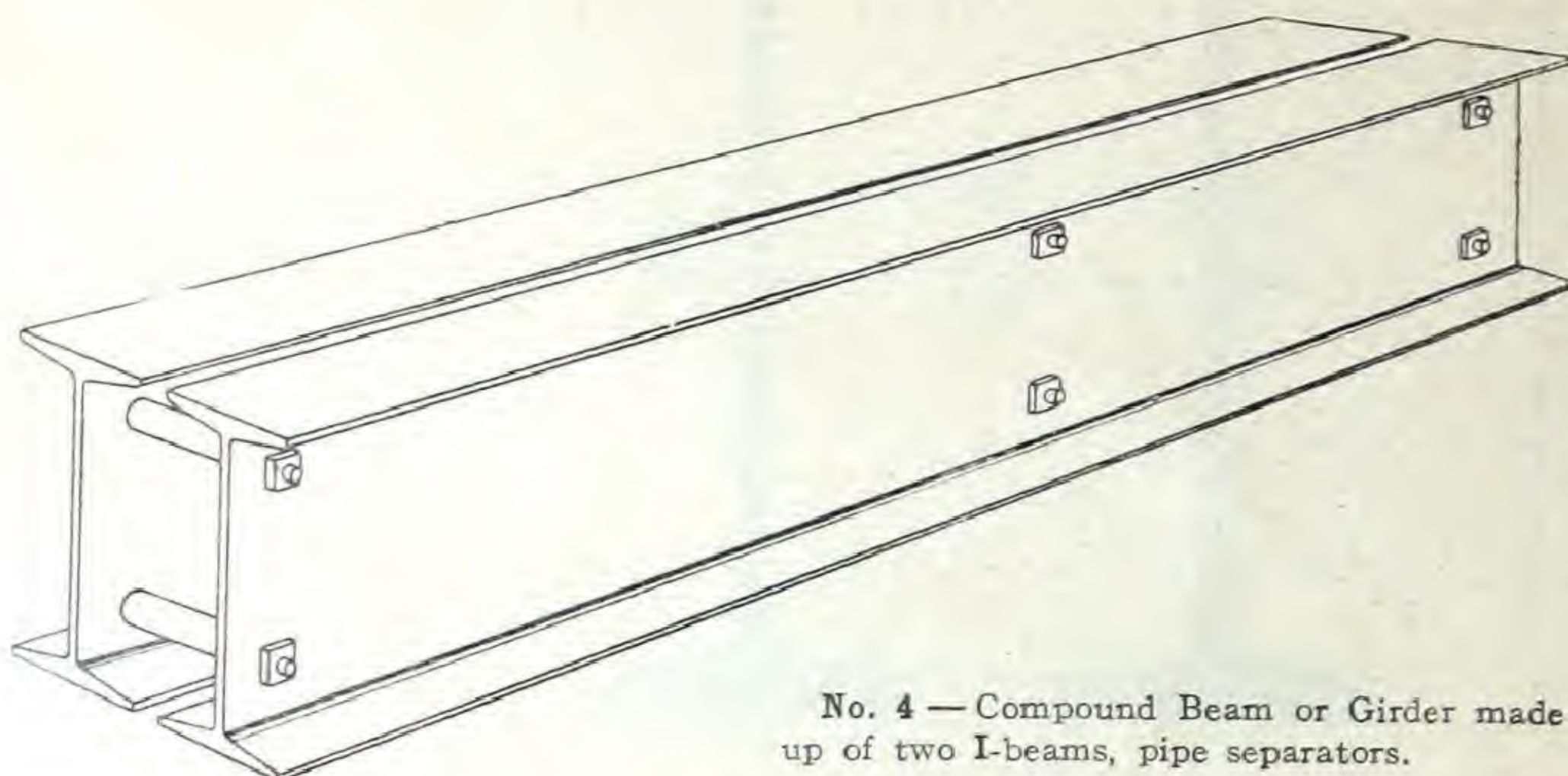
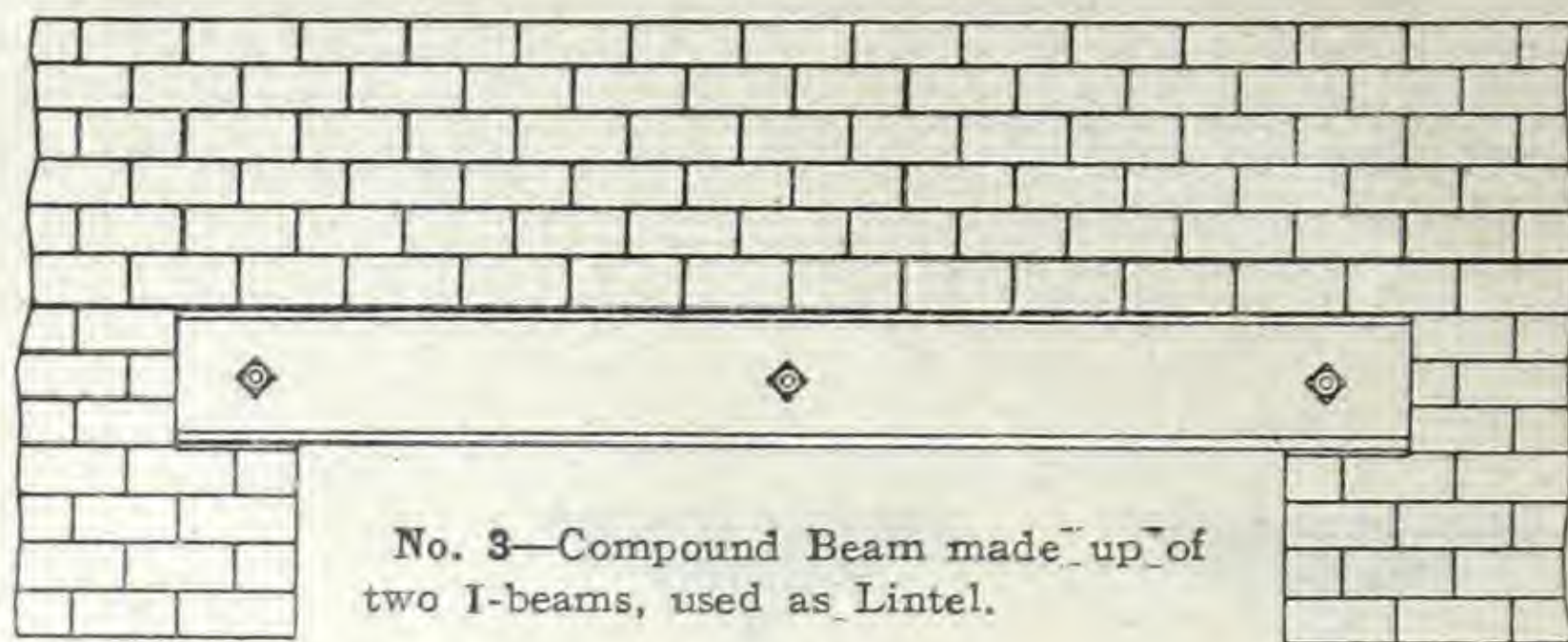
The simplest form of steel beam, and the one generally used in building construction is the I-beam, so called because in section it is like the capital letter I. Illustrations 1 and 2 show I-beams. When two or more I-beams are combined they are called compound beams, and may be used as beams, girders or lintels. Illustration No. 1 shows a compound beam made up of two I-beams fastened together by ordinary machine bolts with standard cast iron separators. No. 2 shows three I-beams fastened together, with separators.

No. 1—Two I-Beams bolted together, with separators.



No. 2—Three I-Beams bolted together, with separators.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Beams, Girders and Lintels—*Continued*

In all modern building construction where permanency and a fire resisting structure are required, steel beams in various combinations are used to carry the floors. In high building construction a steel skeleton frame or cage is designed, which not only carries the floors and roof, but the walls as well. The standard rolled mill shapes or sections used in steel construction besides I-beams, already illustrated, are the channel, plate and angle. These shapes are made in various sizes and weights and are either used separately or in combination. T-bar and Z-bar sections are also obtainable, but their use is not as general as the standard sections above mentioned. Tables giving the sizes and weights of all standard sections will be found further on.

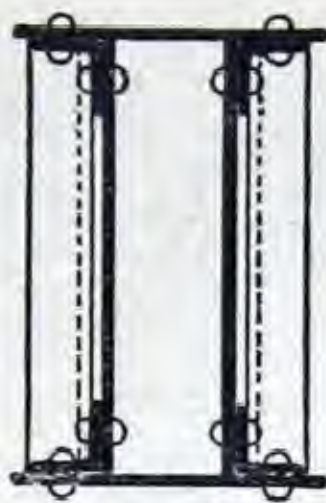
Other types of girders besides the compound I-beam girder, already illustrated, known as box girders, plate girders, lattice or laced girders, etc., made up of I-beams and plates, plates and angles, channels and flat bars, etc., are frequently used. A few such girders are shown in section by Nos. 5, 6 and 7, page 7. These girders should be specially designed by experienced engineers after all the conditions of loading and length of spans are known. They are required for greater loads than can be safely carried by the simple combinations of I-beams or channels.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Beams, Girders and Lintels—Continued



No. 5—Simple Box Girder,
2-10 in. I-Beams,
2-12 x ½ in. Cover plates,
riveted.

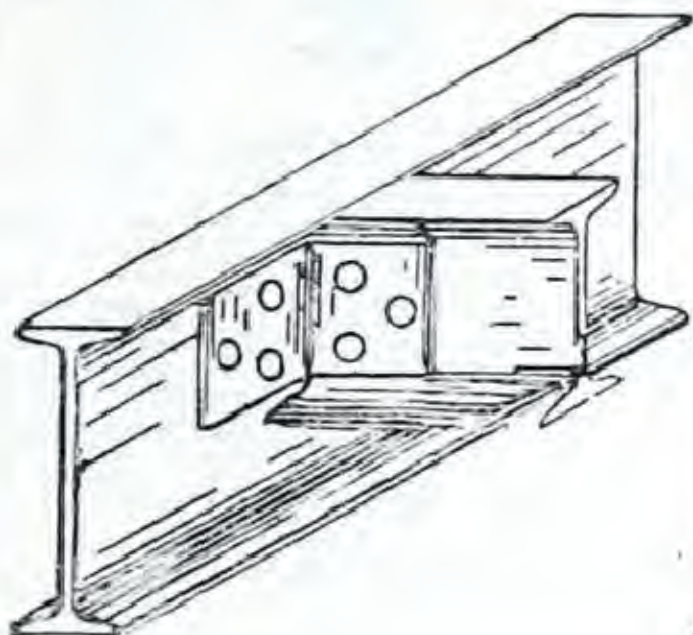


No. 6—Heavy Box Girder.
42 x ½ in. Web plates,
30 x ½ in. Cover plates,
5 x 4 x ½ in. Flange angles
with stiffeners and fillers, all
riveted.

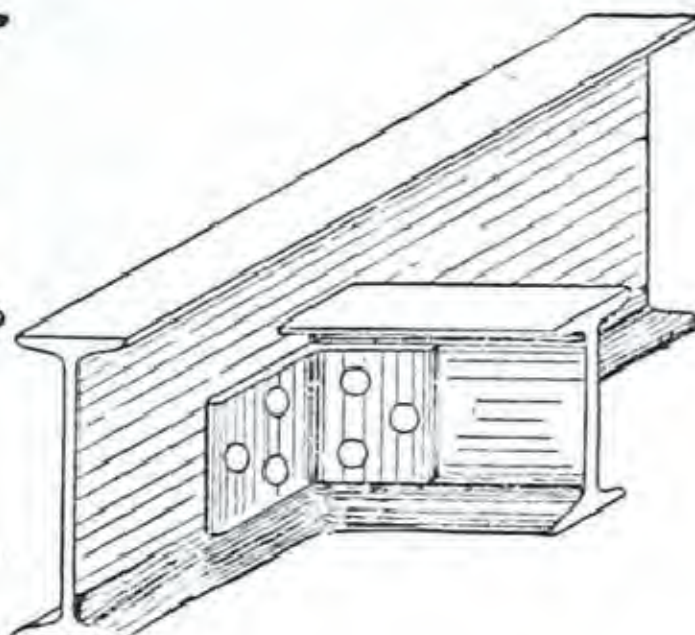


No. 7—Plate Girder.
18 x ½ in. Web plate,
14 x ½ in. Flange plates,
5 x 3 x ½ in. Flange angles,
3 x 2 ½ x ½ in. Stiffener angles,
2 ½ x ½ in. Fillers, all riveted.

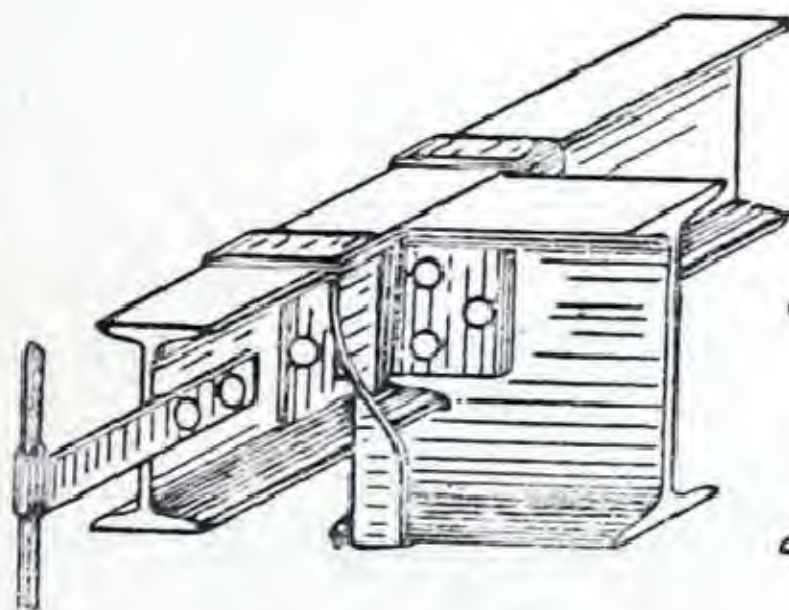
Steel Floor Joists are connected or framed to beams and girders by means of connection angles. Nos. 8, 9, 10 and 11 show simple forms of connections. On page 22 the dimensions and weights of standard connection angles are shown.



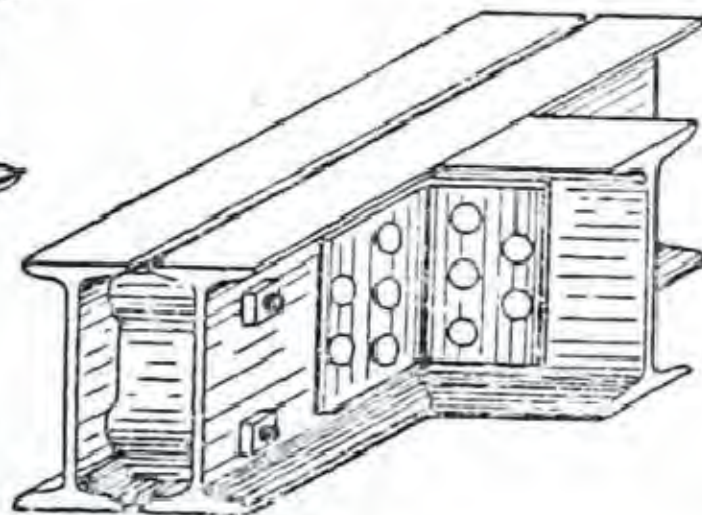
No. 8—I-Beams framed with connection
angles, tops flush.



No. 9—I-Beams framed with connection
angles, bottoms flush.



No. 10—Large I-Beam framed to lighter
one with connection angles and strengthened
with stirrup; wall-anchor also shown.



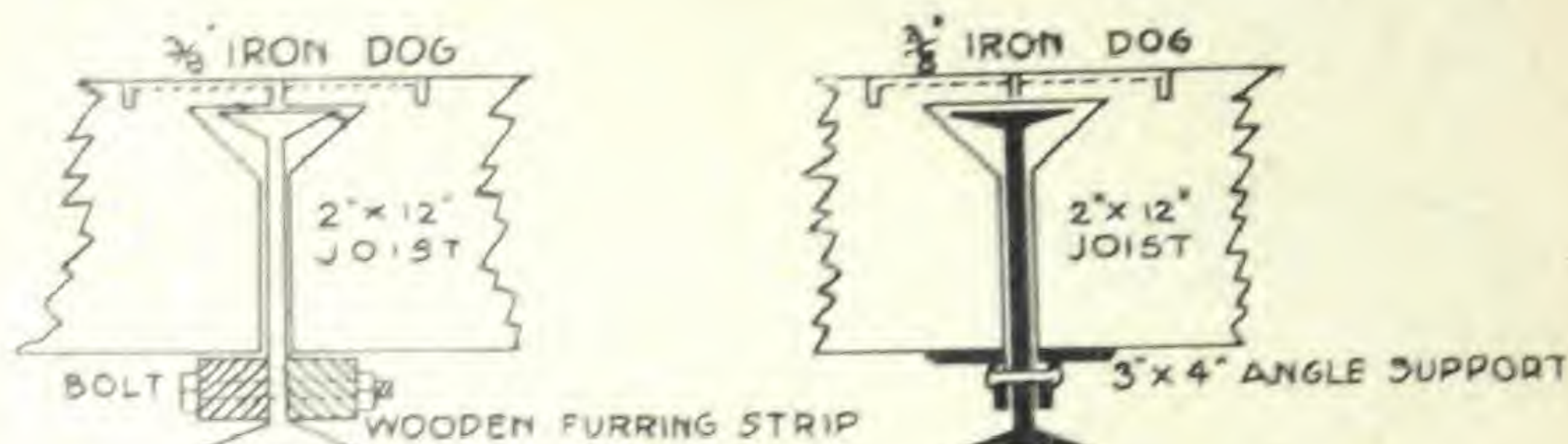
No. 11—I-Beam framed to compound
I-beam Girder, tops flush.

Cast Iron separators are made up to fit any section of I-beam, and are fitted with one or two bolts depending on the depth of the I-beam. The standard width of cast iron separators is such that when in place the inside flange edges of the beams are together. Special widths of all sizes can be furnished if it is necessary to separate or spread the I-beams. Illustration No. 11, page 7, shows a two-bolt cast iron separator in place.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Beams, Girders and Lintels—Continued

Illustrations Nos. 1 and 2, page 5, show cast iron separators, and a table of weights and dimensions of standard sizes is also given on page 23. Single bolt separators are used for all weights of I-beams up to and including 10 inch. For I-beams over 10 inch in depth two bolt separators should be used. All standard sizes of separators are carried in stock for prompt shipment, and special sizes can always be made up quickly. Unless otherwise specified in orders we will ship standard sizes as illustrated.



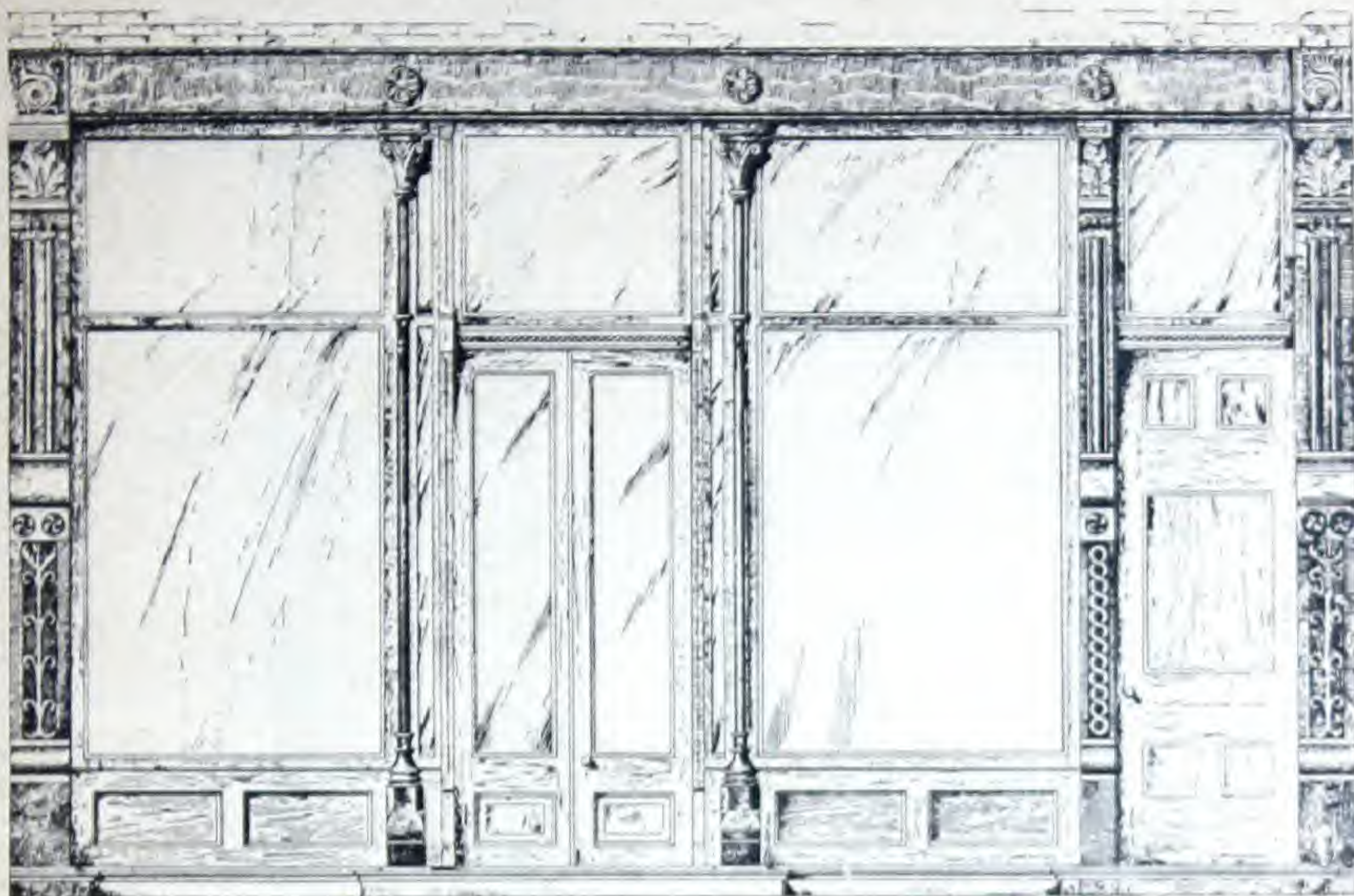
No. 12— I-Beam carrying timber Joists on furring strips.

No. 13— I-Beam carrying timber Joists on steel shelf angles.

There are two ways of framing timber floor joists to steel beams. Illustration No. 12 shows timber joists carried by wooden furring strips or ledger beams, bolted to the steel I-beam with ordinary machine bolts, spaced about thirty inches on centres. No. 13 shows timber joists carried on steel shelf angles riveted to the steel I-beam. This latter method is preferable because of the permanency and rigidity of the supporting angles, although the first cost is somewhat higher than for the bolted timber furring strips as shown by No. 12.

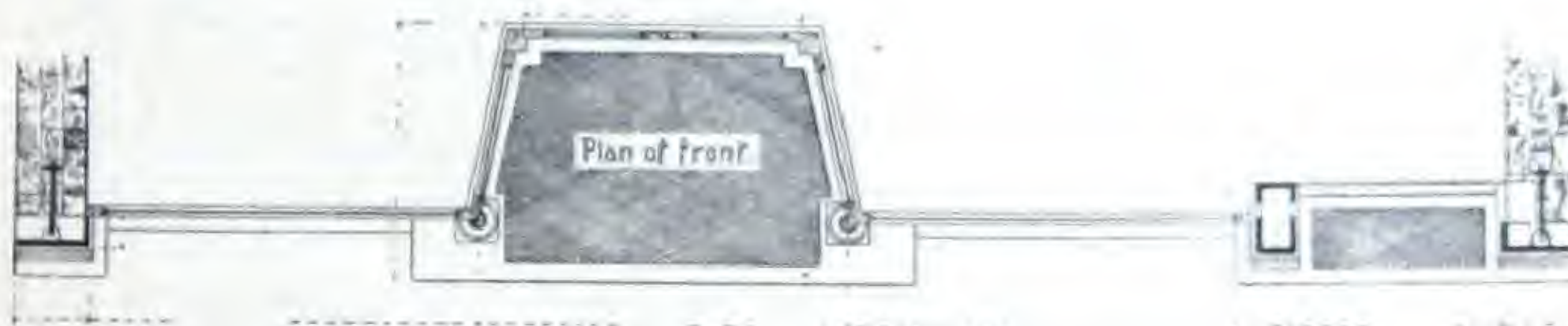
Where the ends of girders or beams rest on walls, bearing plates should be used to distribute the pressure due to the loading, over a greater surface, and thereby prevent the crushing of the material of the wall directly under the girder. On page 21 a table of sizes and weights of bearing plates for different sizes of beams is given, and these sizes are practically standard, although in filling orders for bearing plates the correct sizes are carefully figured from the loading data, by our engineers.

In store buildings it is customary to have show windows across the front, between the side walls. The wall above the windows is carried by a girder, see No. 14, page 9. These girders may be carried by the side walls or on side columns as shown by No. 14. Intermediate columns are usually provided at each side of the entrance, and at side of hallway, as shown. All such girders or compound beams should be carefully designed to suit the particular conditions which exist, and to meet the views of the proprietor or builder.

Beams, Girders and Lintels—*Continued*

No. 14—Store Front.

The front shown is made up of one girder consisting of two steel I-beams, fitted with separators and rosettes, carrying wall above, two gas pipe columns with ornamental cast iron caps and bases, at angles of doorway, one cast iron hall column with ornamental face and two cast iron side columns or pilasters with ornamental faces.



No. 15—Plan of Store Front.

Illustration No. 15, page 9, shows in plan the arrangement of the columns as regards the side walls and doorway.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

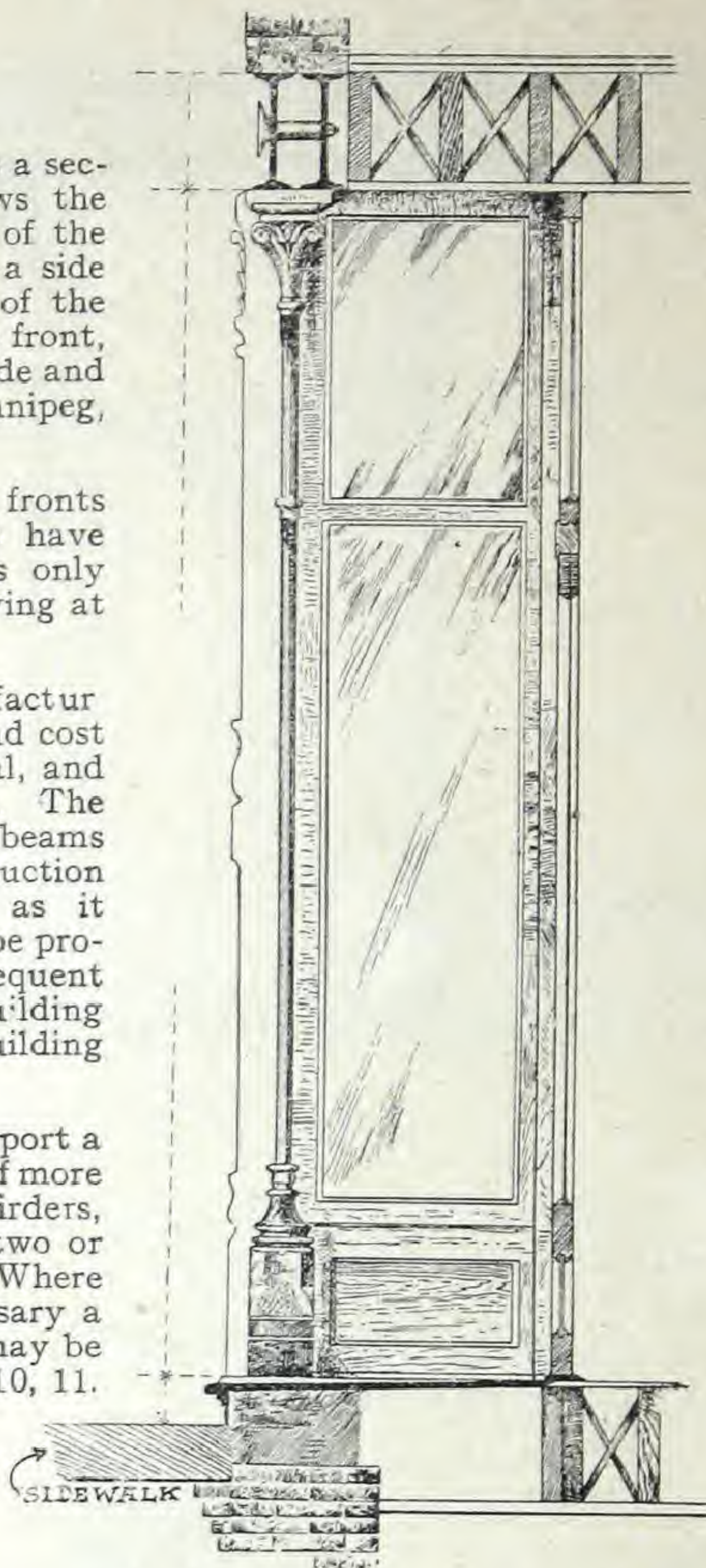
Beams, Girders and Lintels — *Continued*

Illustration No. 16, page 10, is a section through doorway, and shows the I-beams forming the girder, one of the pipe columns and an outline of a side column or pilaster. The cost of the steel and iron complete for a store front, as illustrated, twenty-five feet wide and sixteen feet high, F. O. B. Winnipeg, would be \$350.00

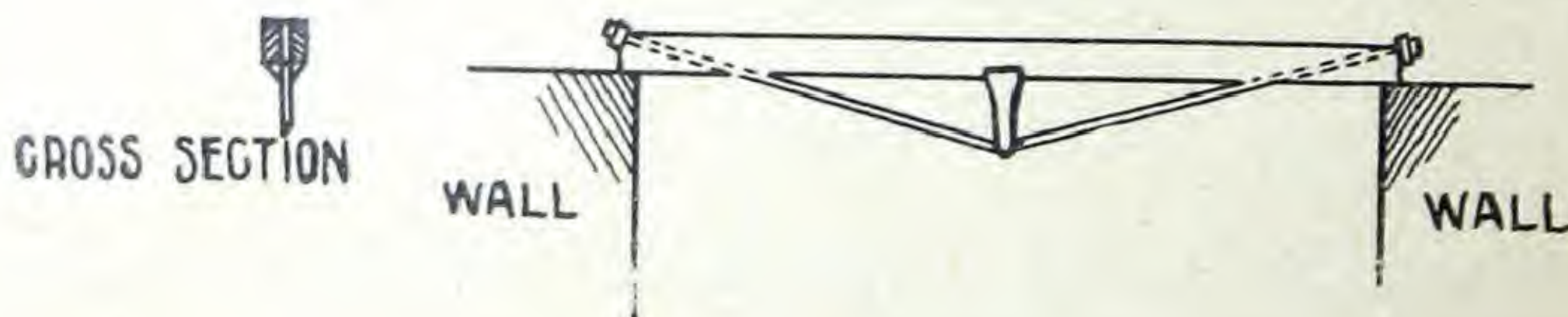
There are many other designs of fronts manufactured, and for which we have patterns. The one illustrated is only intended for the purpose of arriving at an approximate cost.

Some of the styles we manufacture are plainer than the one shown and cost less. Many are more ornamental, and are consequently more expensive. The use of such a combination of I-beams and columns in store front construction is most economical inasmuch as it enables a large clear opening to be provided which will permit of subsequent alterations to the front of the building without interference with the building proper.

Whenever it is necessary to support a floor upon girders having a span of more than thirty feet, either trussed girders, riveted steel plate girders, or two or more steel beams are required. Where economical construction is necessary a trussed wooden beam or girder may be used. See Nos. 17 and 18, pages 10, 11.

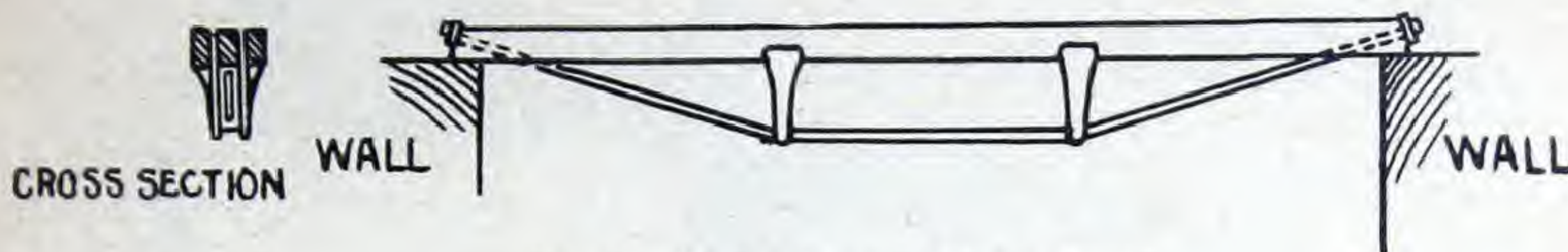


No. 16—Section through center of doorway, store front.



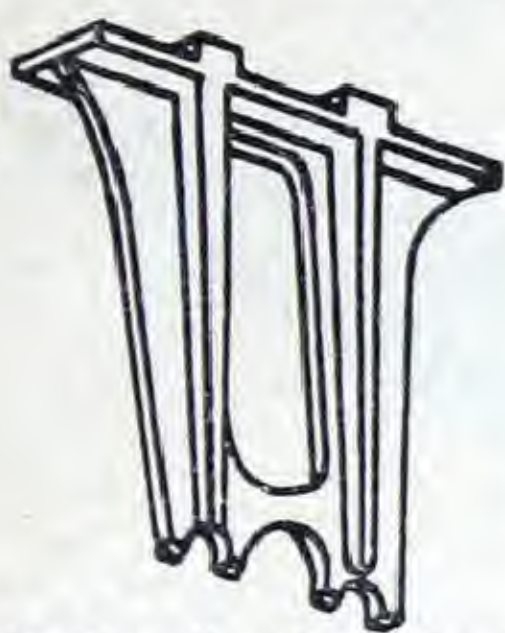
No. 17—Single Strut belly-rod Truss.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Beams, Girders and Lintels—*Continued*

No. 18—Double Strut belly-rod Truss.

These girders may consist of two wooden beams, with one rod between them with one or two struts, known as single or double strut belly-rod trusses, or three beams and two rods with one or two struts as illustrated.



No. 19—Cast iron Strut.

No. 19, page 11, shows a cast iron strut for two rods and three timbers.

The wooden beams should be in one continuous length for the whole span. The dimensions of the beams, rods and struts must be determined from the length of span, floor loading and kind of timber available. These wooden trussed girders are often used to support floors above billiard rooms in hotels and stores, so that it will not be necessary to place supporting columns in the space below. The struts are usually made of cast iron, (see No. 19), and may be of any length from 3 inches to 3 feet.

We furnish all of the iron work for girders of this type, and will give the required dimensions of all parts to any of our customers without charge.

To support the wall over door and window openings, steel or cast iron lintels are used. One type of steel lintel, the compound I-beam, has already been shown by No. 3, page 6. Other forms of steel lintels are shown by Nos. 20, 21 and 22.



No. 20—Single I-beam Lintel.



No. 21—Compound angle Lintel.



No. 22—Single angle Lintel.

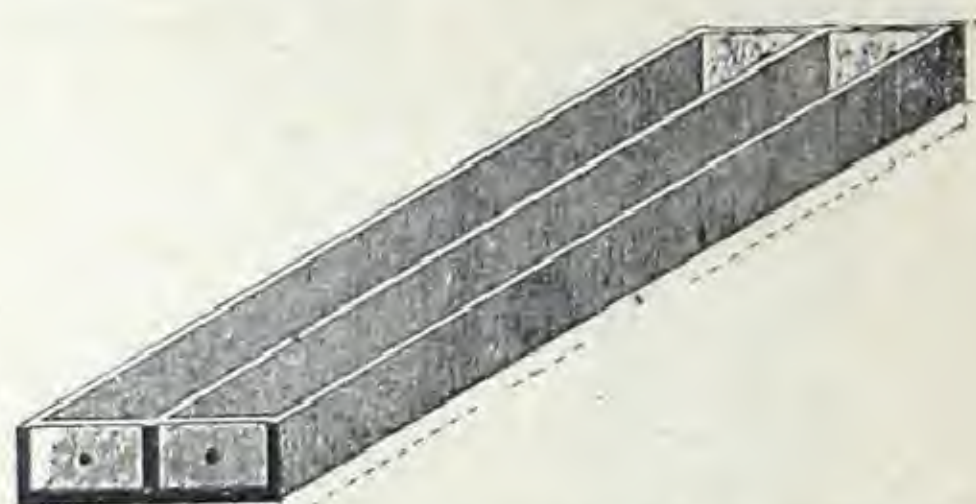
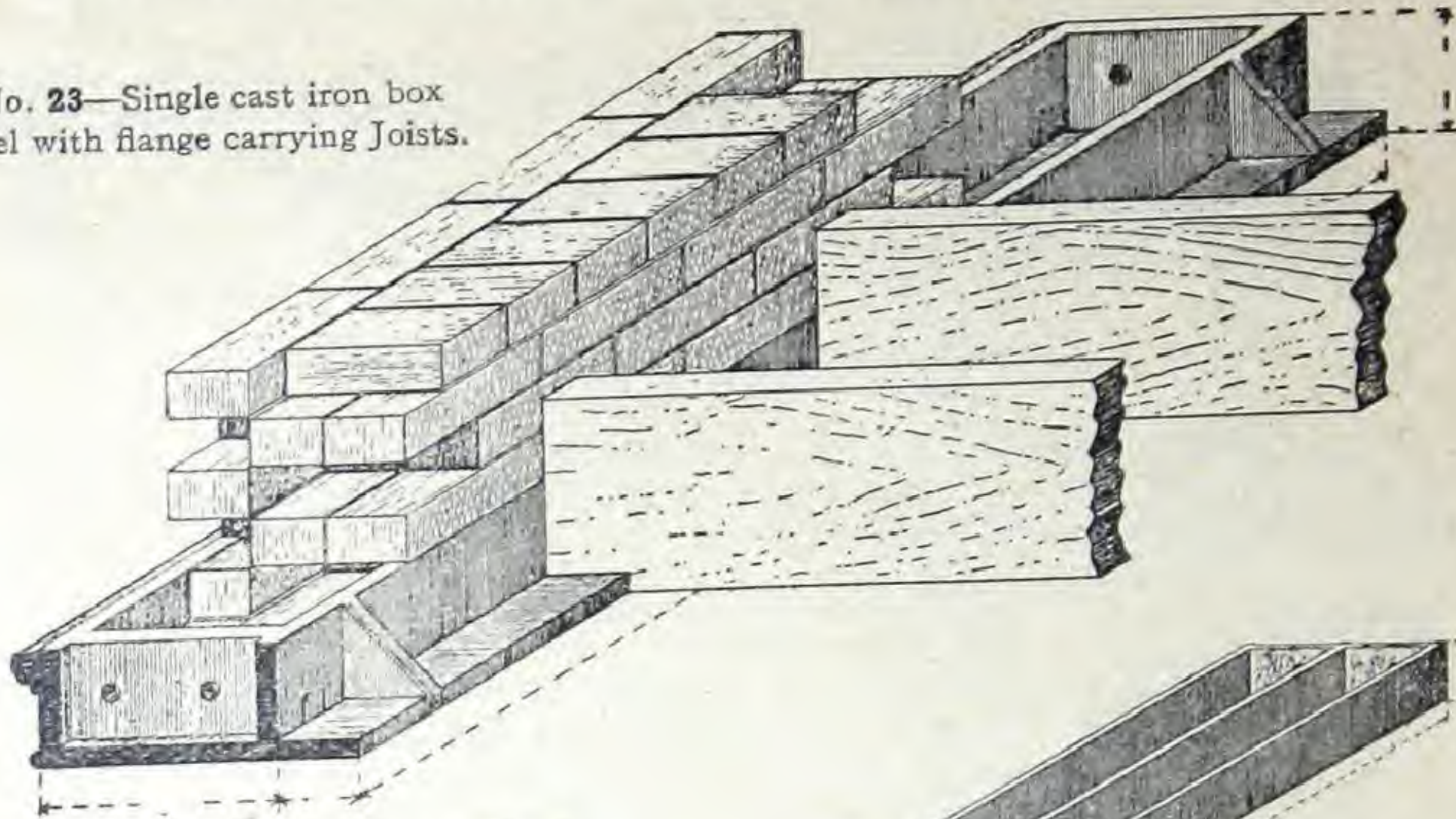
The proper section to be used depends upon the load to be carried. This load is the weight of the wall contained within the sides of an equilateral triangle, having a base equal to the width of the clear opening. To this weight must be added any section of floor which may be carried by the lintel, and due allowance must be made for openings in the wall which come within the area of the triangle. Cast iron lintels are frequently used. Nos. 23 to 30 inclusive illustrate various styles of these lintels, both plain and ornamental.

When ordering lintels, either steel or cast iron, always state clear width of opening, thickness of walls, material of which wall is constructed, and whether any weight except the wall above is to be carried by the lintel. State whether steel or cast iron is wanted and what style. If cast iron, state whether ornamental or plain is required. We will be able to determine the right thickness and weight of metal required if the above information is given and will furnish lintels of correct dimensions.

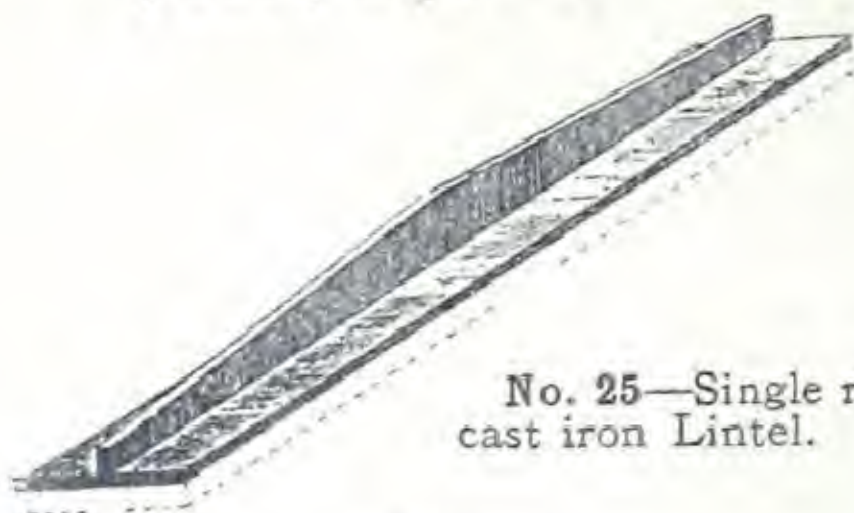
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Beams, Girders and Lintels—*Continued*

No. 23—Single cast iron box Lintel with flange carrying Joists.



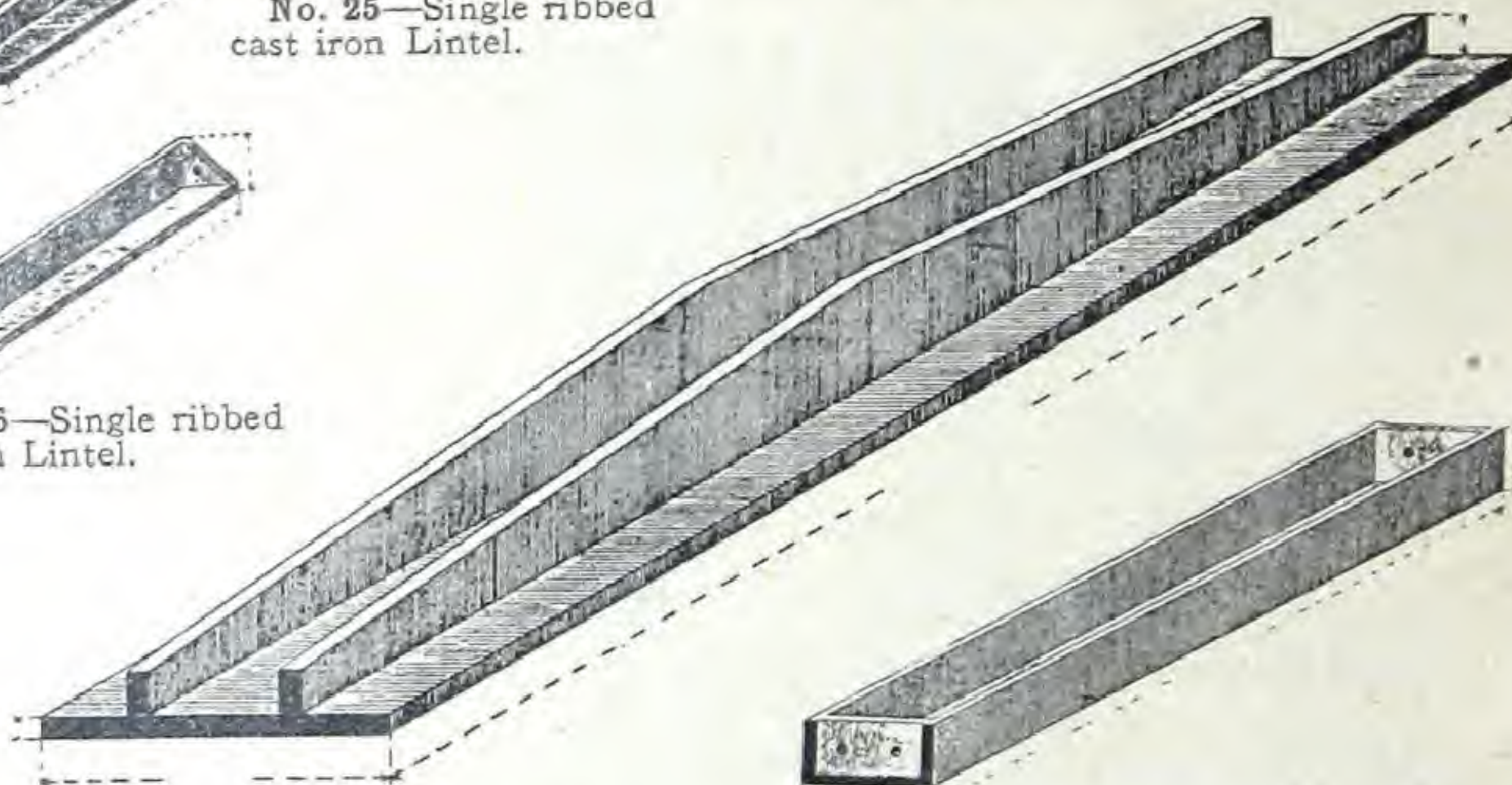
No. 24—Plain cast iron double box Lintel.



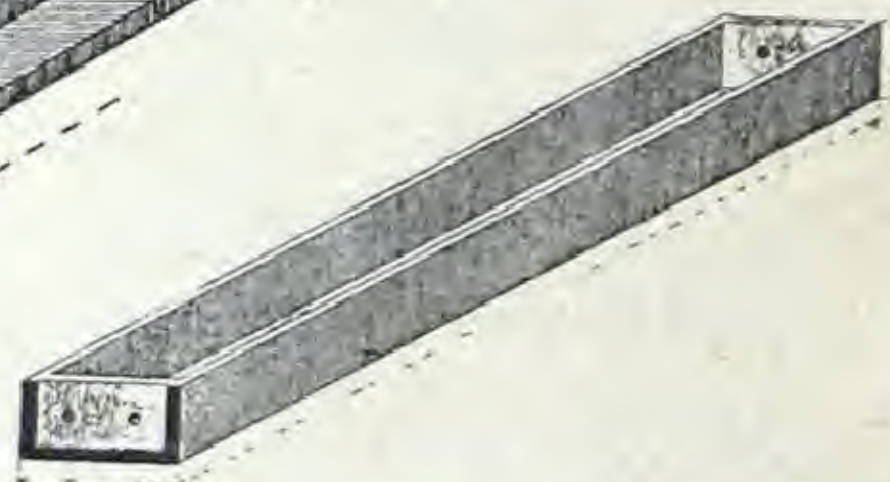
No. 25—Single ribbed cast iron Lintel.



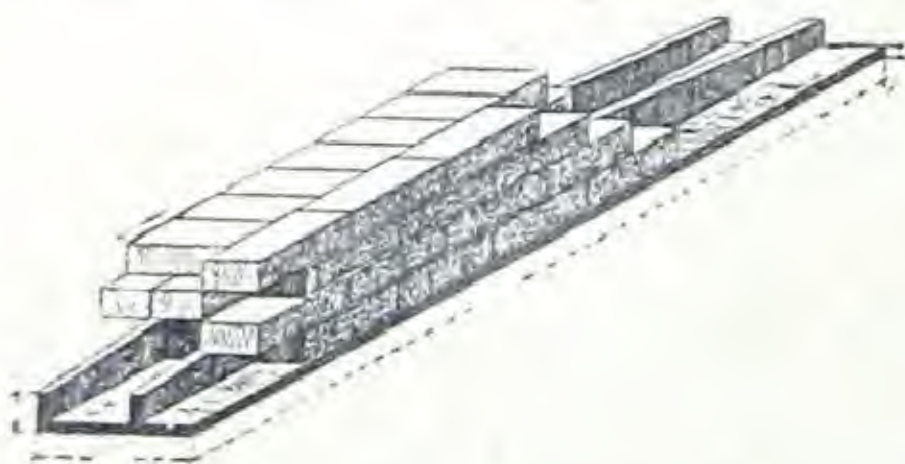
No. 26—Single ribbed cast iron Lintel.



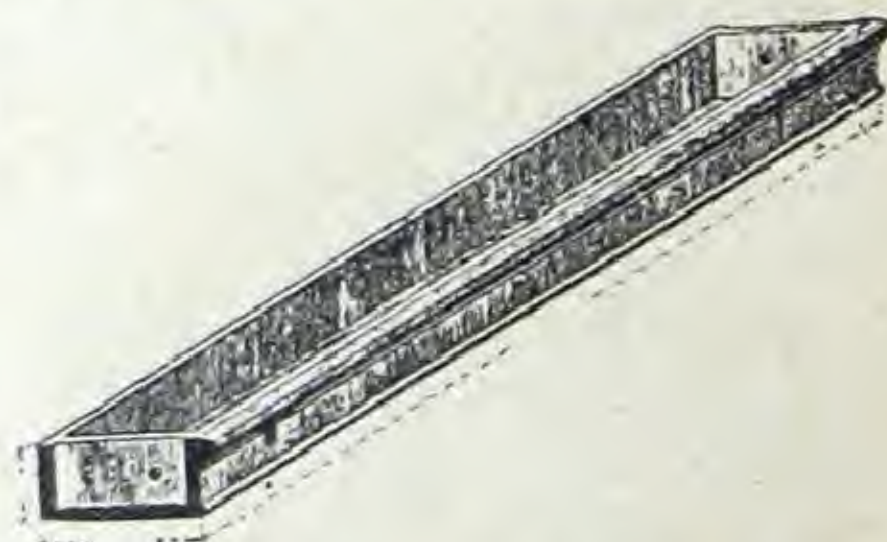
No. 27—Double ribbed cast iron Lintel.



No. 28—Plain cast iron single box Lintel.



No. 29—Double ribbed cast iron Lintel with plain face.

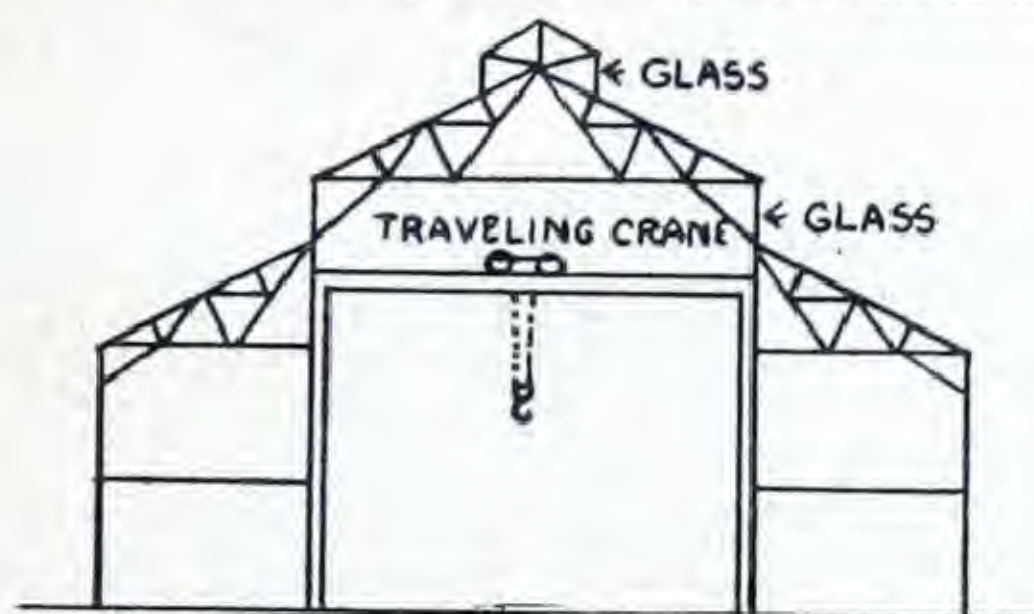
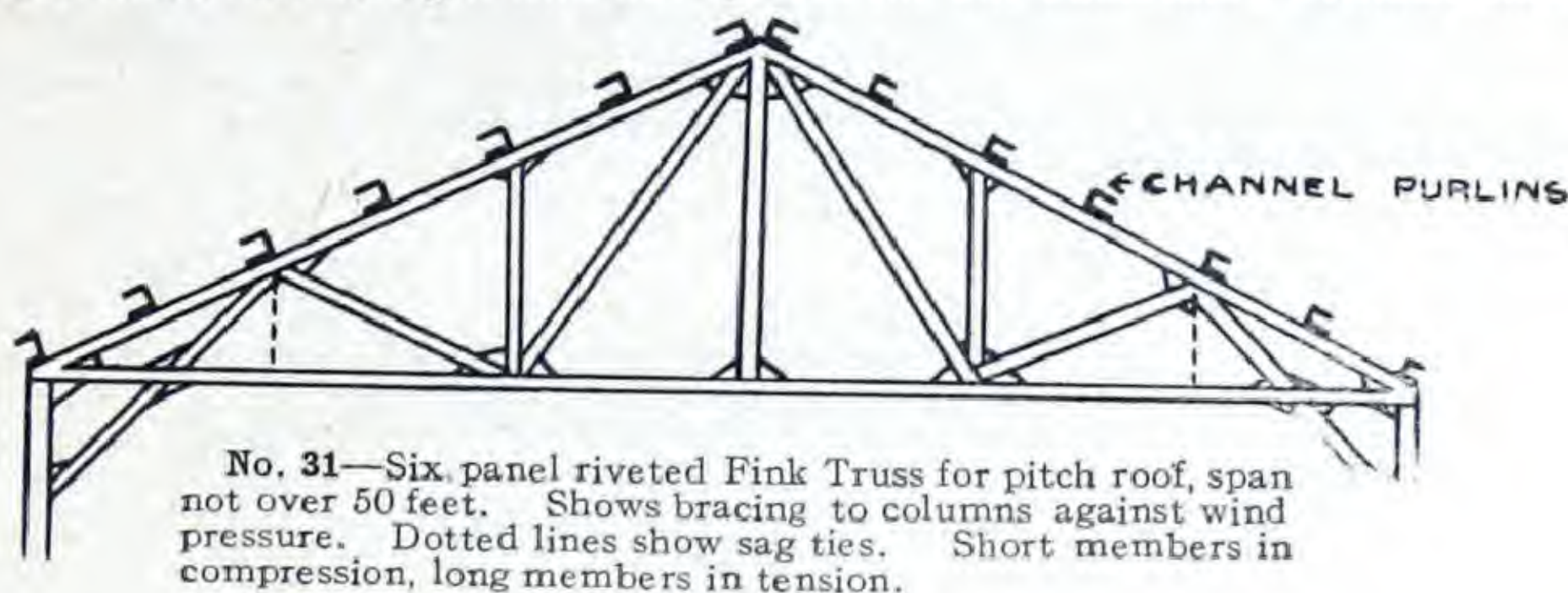


No. 30—Single box cast iron Lintel with ornamental face.

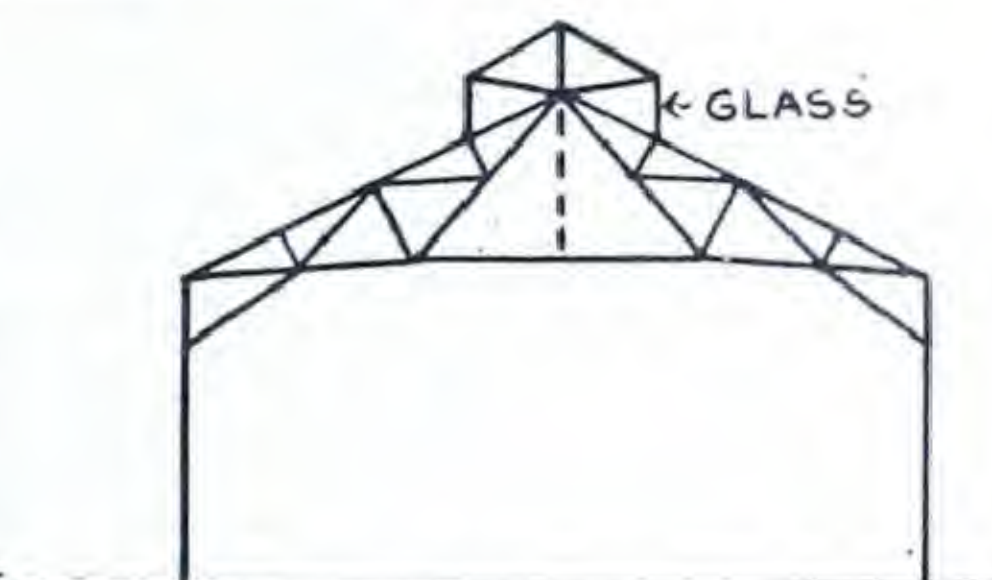
Trusses

In the construction of modern buildings, such as power houses, car barns, railway stations, churches, theatres, municipal buildings, etc., steel trusses are used to support the roof. Illustrations Nos. 31 to No. 44 inclusive, pages 13, 14 and 15, show types of such trusses now in general use.

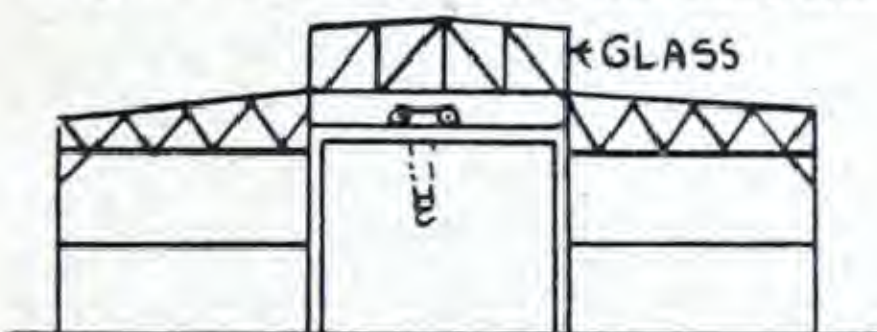
These trusses are constructed of angles with plates at the connecting points, called panel points, and the different members are riveted together, except on long spans when the trusses are pin connected. Trusses must be designed to suit the conditions for which they are required, and the most economical type can only be determined when all these conditions are known. It is our practice to furnish designs and cost prices for our customers without charge.



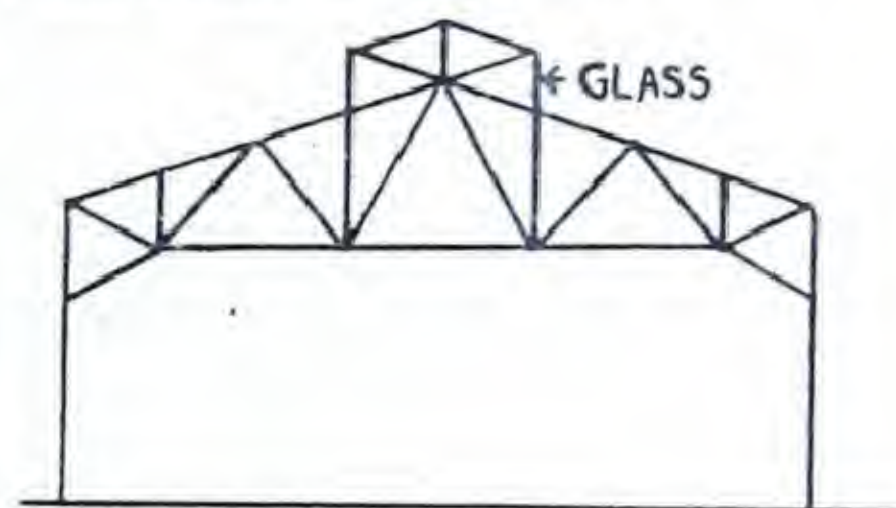
No. 32—Steel framing for Foundry, Machine Shop or Train Shed, with traveling crane.



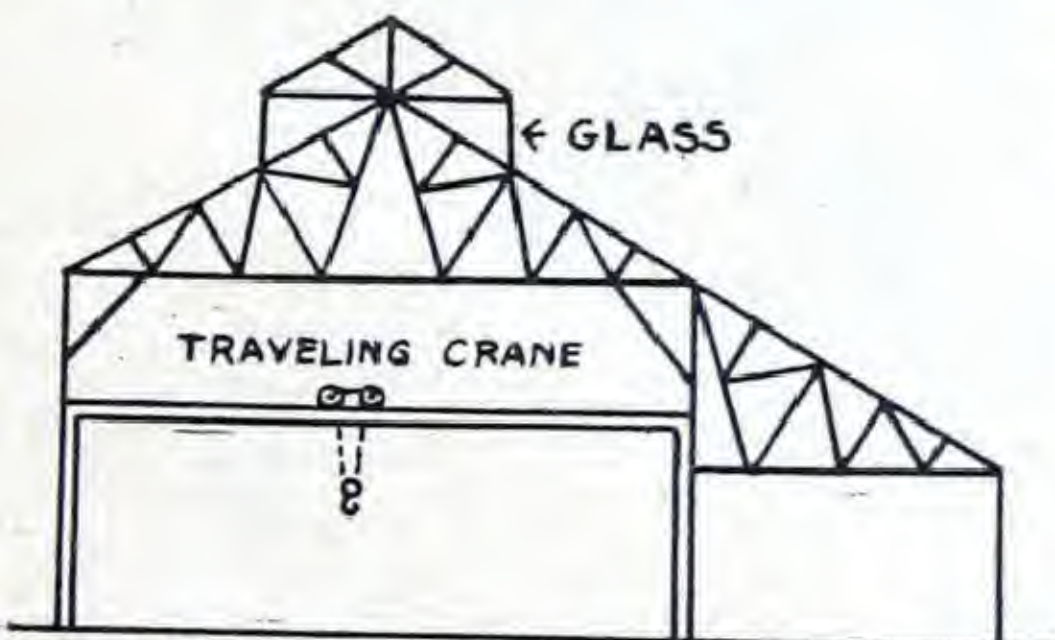
No. 33—Steel framing for Foundry or Moulding Shed, without crane.



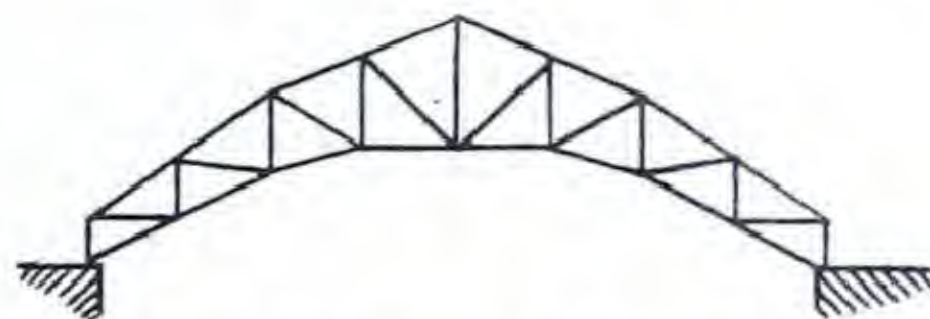
No. 34—Steel framing for Foundry, Machine Shop or Train Shed, with traveling crane.



No. 35—Steel framing for Foundry, Machine Shop or Train Shed, without crane.



No. 36—Steel framing for Foundry, Machine Shop or Train Shed, with crane.



No. 37—Eight panel Camel's Back or modified Pratt Truss for pitch roof, long spans, pin connected, struts or verticals in compression, diagonals in tension.

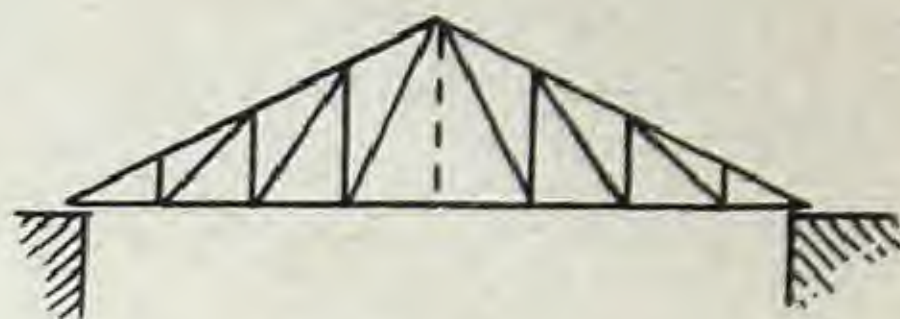
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Trusses—Continued



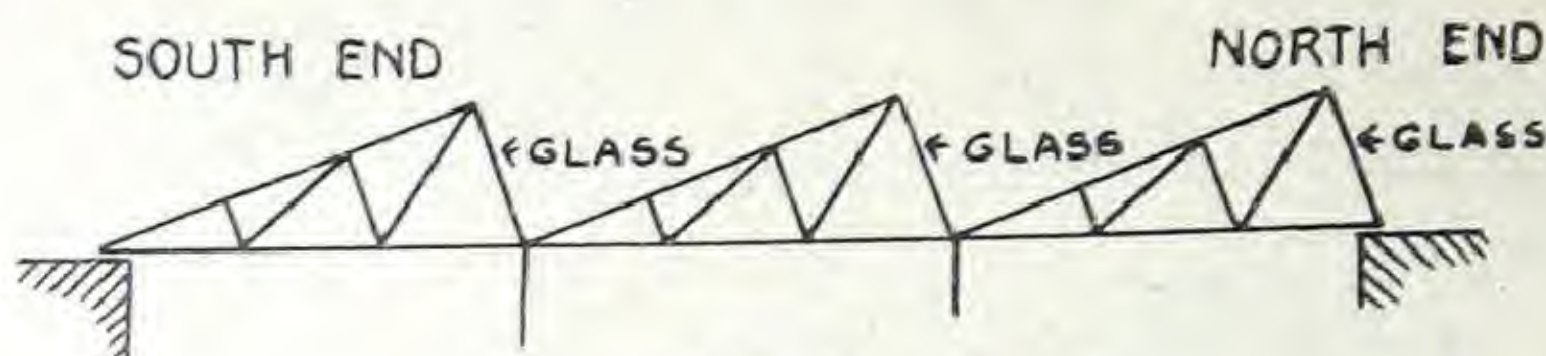
No. 38

Eight panel Quadrangular or modified Pratt Truss for pitch roof. Spans up to 150 feet. Lower chord cambered to reduce length of struts. Struts or vertical members in compression, all diagonals in tension. Used in Train Sheds, Rinks, Halls, etc.



No. 39

Eight panel Pratt Truss for pitch roof. Span not over 100 feet, ends resting on walls. Struts or vertical members in compression, diagonals or ties in tension.



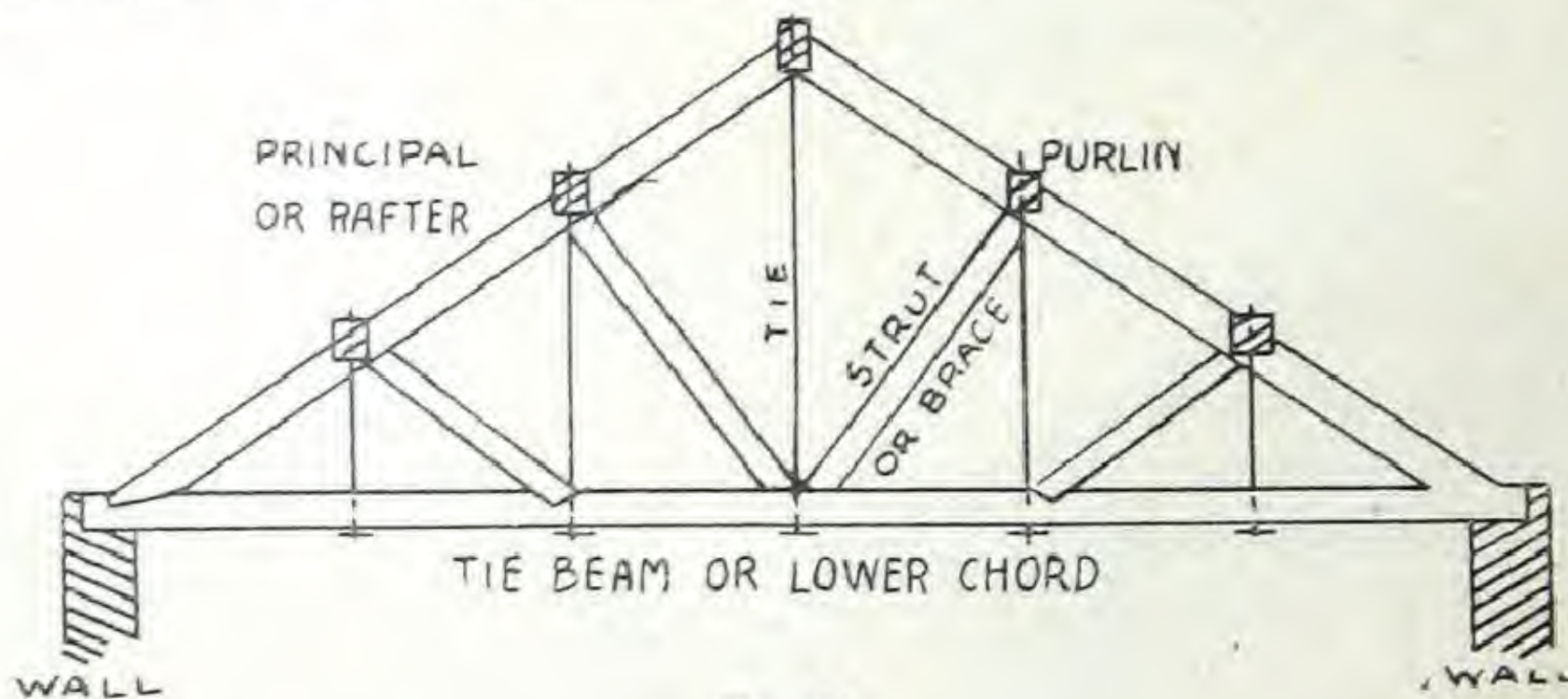
No. 40

Steel framing for saw tooth roof.

Wooden trusses are also made in a great variety of designs. No. 41, page 14, shows a simple type of wooden truss, known as a Queen truss, and has six panels. This same truss with the top cut off is shown by No. 42. The principal members or chords, also the struts, are timbers and the ties are iron rods. These types are commonly used to support pitch and deck roofs. Plate washers and angle washers are placed at the ends of the rods.

Wooden trusses are popular in church construction and for other buildings where no ceiling is required. No. 43, page 15, shows a simple type of light wooden truss for pitch roof for spans up to about forty feet. The ties have pin connected joints. The wooden members can be made as ornamental as desired.

No. 44, page 15, shows a truss (one-half) suitable for carrying the roof of a rink, auditorium or exhibition building. The chords and struts are timber, the ties iron rods, with pin connections. This type of truss is largely used in this country when a clear space below without columns is required. We will furnish all the iron work for any kind of wooden truss and will also supply working designs for our customers at any time.

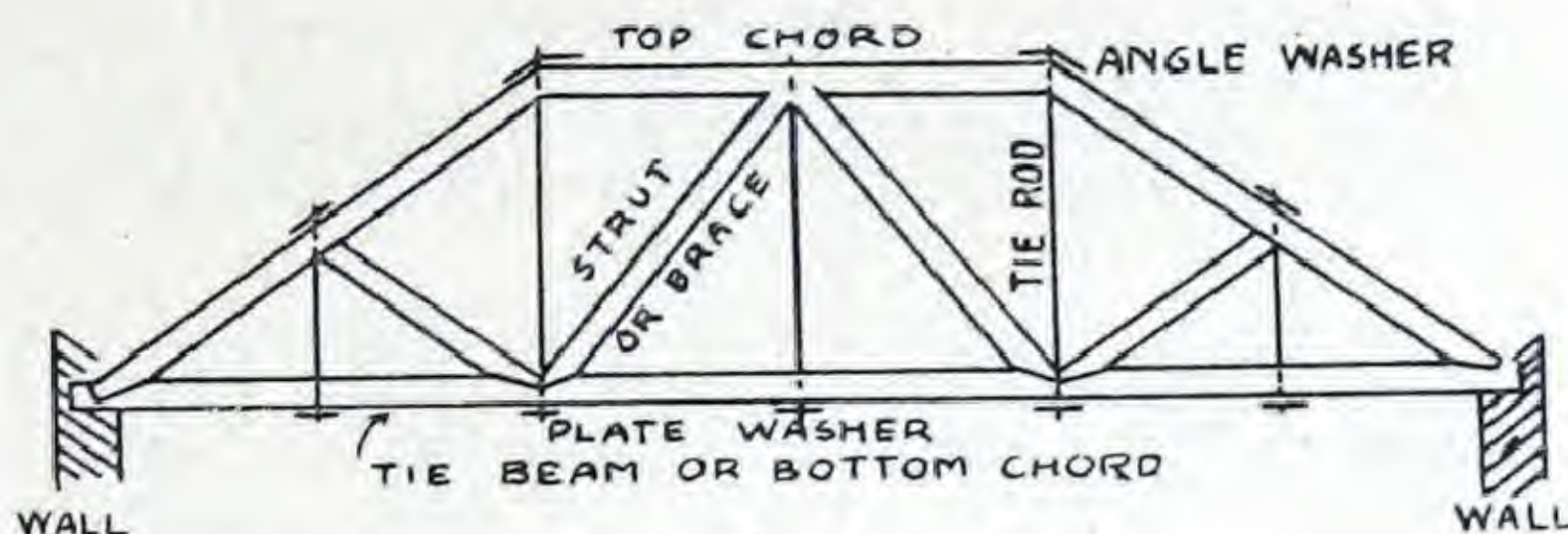


No. 41

Six panel Queen Truss for pitch roof. Timbers in compression, rods in tension. Spans from 36 to 50 feet. Ceiling may be hung from lower chord.

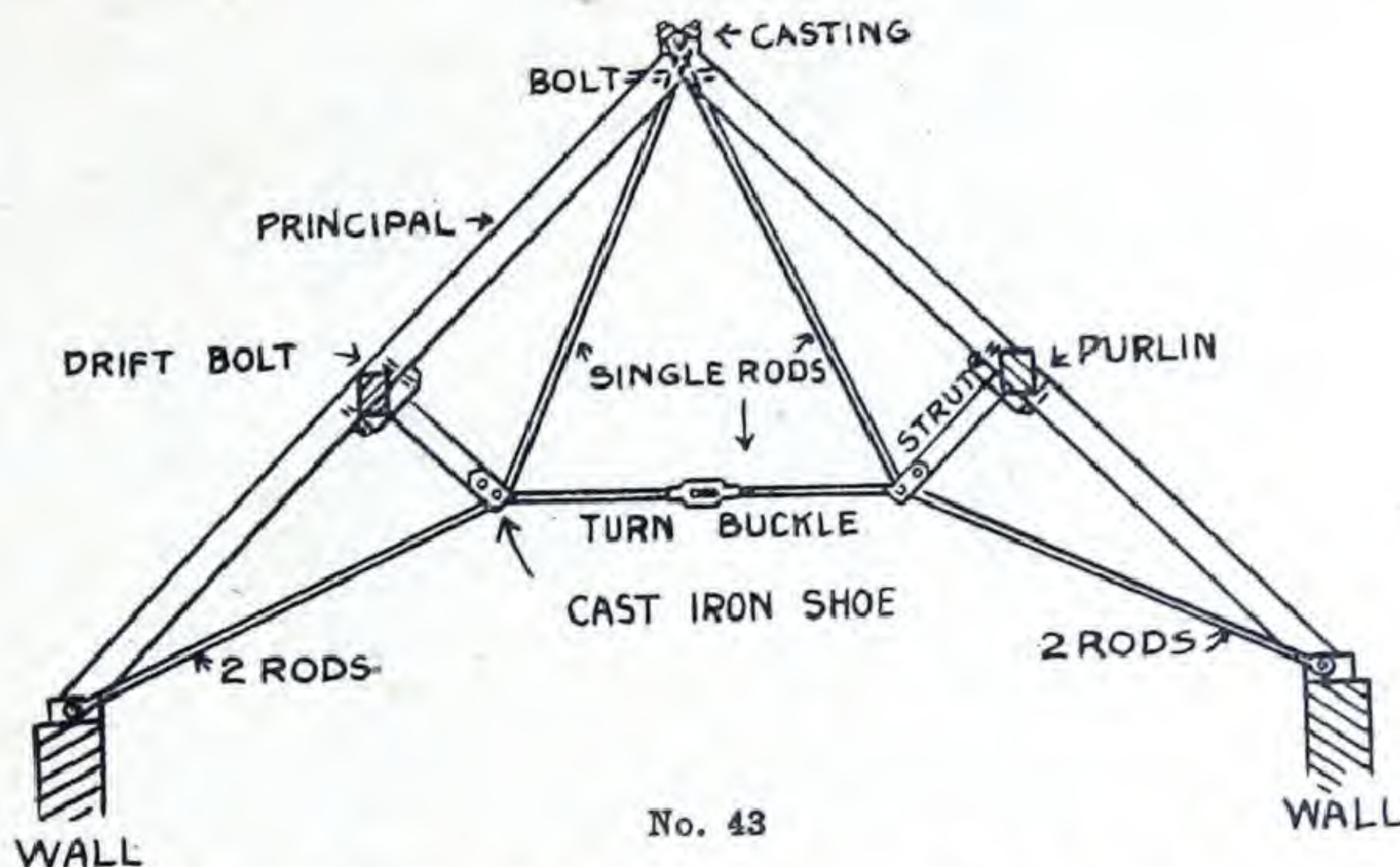
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Trusses — Continued



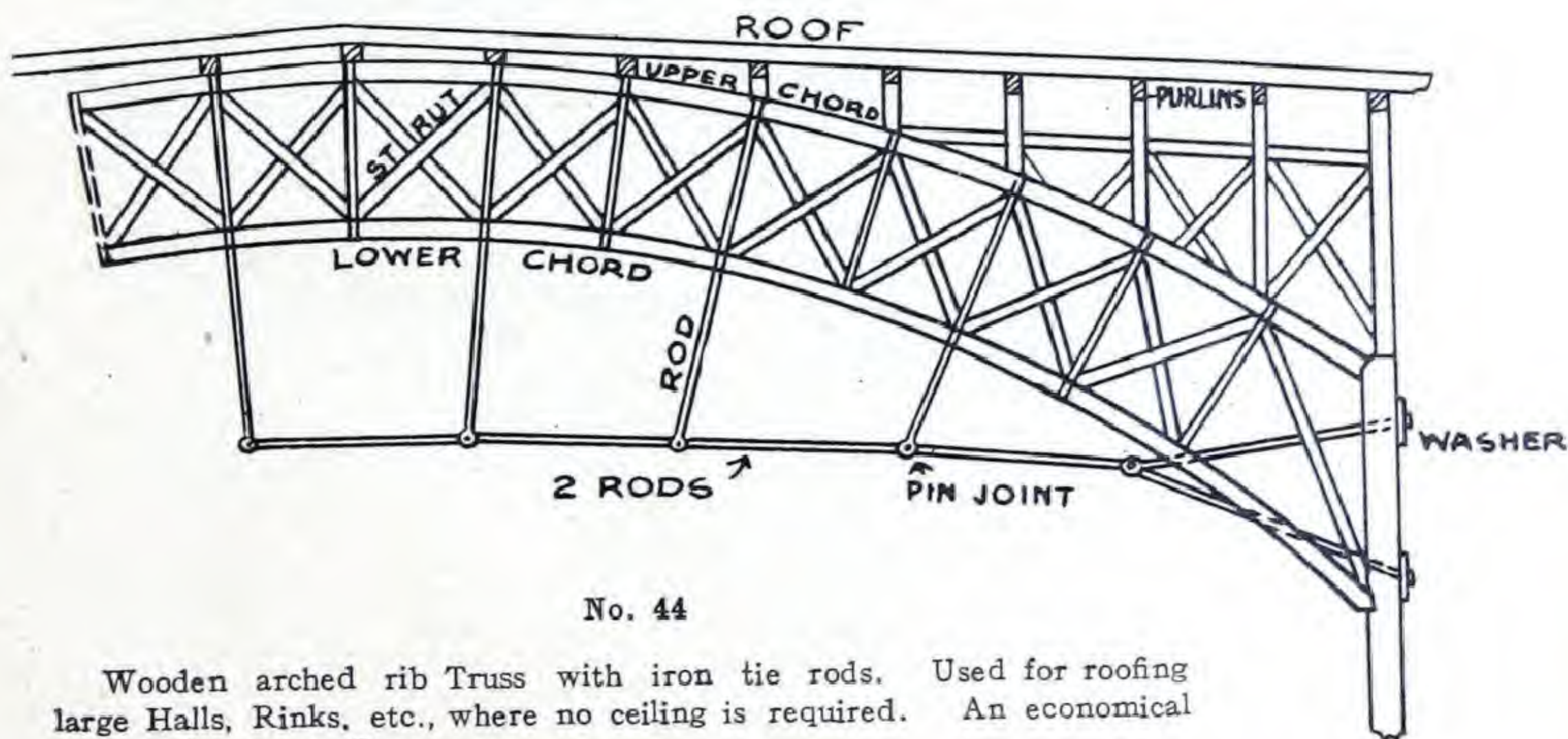
No. 42

Six panel Queen Truss for deck roof. Timbers in compression, rods in tension. Spans 40 to 52 feet. Ceiling may be carried on lower chord.



No. 43

Combination timber and iron Truss for pitch roof used where no ceiling is constructed. Spans up to 40 feet. Timbers in compression, rods in tension.



No. 44

Wooden arched rib Truss with iron tie rods. Used for roofing large Halls, Rinks, etc., where no ceiling is required. An economical type of long span Truss.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

WEIGHTS AND DIMENSIONS OF STEEL I-BEAMS

Depth of Beam Inches	Weight per Foot Pounds	Th'kness of Web Inches	Width of Flange Inches	Depth of Beam Inches	Weight per Foot Pounds	Th'kness of Web Inches	Width of Flange Inches
3	7.50	0.361	2.521	15	55.00	0.656	5.746
	6.50	0.263	2.423		50.00	0.558	5.648
	5.50	0.170	2.330		45.00	0.460	5.550
4					42.00	0.410	5.500
	10.50	0.410	2.880	15	75.00	0.882	6.292
	9.50	0.337	2.807		70.00	0.784	6.194
	8.50	0.263	2.733		65.00	0.686	6.096
	7.50	0.190	2.660		60.00	0.590	6.000
5	14.75	0.504	3.294	15	100.00	1.184	6.774
	12.25	0.357	3.147		95.00	1.085	6.675
	9.75	0.210	3.000		90.00	0.987	6.577
6					85.00	0.889	6.479
	17.25	0.475	3.575	18	80.00	0.810	6.400
	14.75	0.352	3.452		70.00	0.719	6.259
	12.25	0.230	3.330		65.00	0.637	6.177
7					60.00	0.555	6.095
	20.00	0.458	3.868		55.00	0.460	6.000
	17.50	0.353	3.763	20			
	15.00	0.250	3.660		75.00	0.649	6.399
8					70.00	0.575	6.325
	25.50	0.541	4.271		65.00	0.500	6.250
	23.00	0.449	4.179	20	100.00	0.884	7.284
	20.50	0.357	4.087		95.00	0.810	7.210
9	18.00	0.270	4.000		90.00	0.737	7.137
					85.00	0.663	7.063
	35.00	0.732	4.772		80.00	0.600	7.000
	30.00	0.569	4.609	24			
10	25.00	0.406	4.446		100.00	0.754	7.254
	21.00	0.290	4.330		95.00	0.692	7.192
					90.00	0.631	7.131
	40.00	0.749	5.099		85.00	0.570	7.070
12	35.00	0.602	4.952		80.00	0.500	7.000
	30.00	0.455	4.805	NOTE—Weights in heavy print are standard, others are special.			
	25.00	0.310	4.660				
	55.00	0.822	5.612				
	50.00	0.699	5.489				
	45.00	0.576	5.366				
	40.00	0.460	5.250				
	35.00	0.436	5.086				
	31.50	0.350	5.000				

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

WEIGHTS AND DIMENSIONS OF STEEL CHANNELS

Depths of Channels Inches	Weight per Foot Pounds	Th'kness of Web Inches	Width of Flange Inches	Depths of Channels Inches	Weight per Foot Pounds	Th'kness of Web Inches	Width of Flange Inches
3	6.00	0.362	1.602	9	25.00	0.615	2.815
	5.00	0.264	1.504		20.00	0.452	2.652
	4.00	0.170	1.410		15.00	0.288	2.488
4	7.25	0.325	1.725		13.25	0.230	2.430
	6.25	0.252	1.652	10	35.00	0.823	3.183
	5.25	0.180	1.580		30.00	0.676	3.036
5	11.50	0.477	2.037		25.00	0.529	2.889
	9.00	0.330	1.890		20.00	0.382	2.742
	6.50	0.190	1.750		15.00	0.240	2.600
6	15.50	0.563	2.283	12	40.00	0.758	3.418
	13.00	0.440	2.160		35.00	0.636	3.296
	10.50	0.318	2.038		30.00	0.513	3.173
	8.00	0.200	1.920		25.00	0.390	3.050
7	19.75	0.633	2.513	15	20.50	0.280	2.940
	17.25	0.528	2.408		55.00	0.818	3.818
	14.75	0.423	2.303		50.00	0.720	3.720
	12.25	0.318	2.198		45.00	0.622	3.622
	9.75	0.210	2.090		40.00	0.524	3.524
8	21.25	0.582	2.622		35.00	0.426	3.426
	18.75	0.490	2.530		33.00	0.400	3.400
	16.25	0.399	2.439	NOTE:—Weights in heavy print are standard, others are special.			
	13.75	0.307	2.347				
	11.25	0.220	2.260				

LIGHT STEEL CHANNELS

Size in Inches	Thickness	Weight per Foot in Pounds	Stock Lengths
$\frac{5}{8}$ X $\frac{5}{8}$	No. 10 $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{3}{16}$ $\frac{1}{8}$ $\frac{1}{4}$ $\frac{1}{8}$ $\frac{1}{4}$ $\frac{3}{16}$ $\frac{1}{8}$	.42	20 and 25 feet
$\frac{3}{4}$ X $\frac{3}{8}$		.53	20 and 25 feet
$\frac{7}{8}$ X $\frac{7}{8}$		.72	20 and 25 feet
1 X $\frac{1}{2}$		.82	20 and 25 feet
$1\frac{1}{8}$ X $\frac{9}{16}$		1.16	20 and 25 feet
$1\frac{1}{4}$ X $\frac{1}{2}$		1.01	20 and 25 feet
$1\frac{1}{2}$ X $\frac{9}{16}$		1.67	20 and 25 feet
$1\frac{1}{2}$ X $\frac{3}{4}$		1.32	20 and 25 feet
2 X $\frac{5}{8}$		2.32	20 and 25 feet
2 X 1		2.40	20 and 25 feet
$2\frac{1}{2}$ X $\frac{5}{8}$		2.27	20 and 25 feet

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

WEIGHT OF STEEL ANGLES

(With Fillet)

PER LINEAL FOOT IN POUNDS

Size in Inches	THICKNESS IN INCHES														
	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{7}{8}$	$\frac{15}{16}$	1
8 x8	...	...	...	...	...	...	26.4	29.6	32.7	35.8	38.9	42.0	45.0	48.1	51.0
7 x3 $\frac{1}{2}$	...	...	...	...	...	15.0	17.0	19.1	21.0	23.0	24.9	26.8	28.7	30.5	32.3
6 x6	...	...	...	...	14.9	17.2	19.6	21.9	24.2	26.5	28.7	31.0	33.1	35.3	37.4
6 x4	...	...	...	...	12.3	14.3	16.2	18.1	20.0	21.8	23.6	25.4	27.2	28.9	30.6
6 x3 $\frac{1}{2}$	...	...	...	...	11.7	13.5	15.3	17.1	18.9	20.6	22.4	24.0	25.7	27.3	28.9
5 x5	...	...	...	...	12.3	14.3	16.2	18.1	20.0	21.8	23.6	25.4	27.2	28.9	30.6
5 x4	...	...	...	...	11.0	12.8	14.5	16.2	17.8	19.5	21.1	22.7	24.2	...	...
5 x3 $\frac{1}{2}$	...	...	...	8.7	10.4	12.0	13.6	15.2	16.8	18.3	19.8	21.3	22.7	...	...
5 x3	...	...	...	8.2	9.8	11.3	12.8	14.3	15.7	17.1	18.5	19.9	...	...	...
4 $\frac{1}{2}$ x3	...	...	...	7.7	9.1	10.6	11.9	13.3	14.7	16.0	17.3	18.5	...	...	...
4 x4	...	...	...	8.2	9.8	11.3	12.8	14.3	15.7	17.1	18.5	19.9	...	...	...
4 x3 $\frac{1}{2}$	...	...	...	7.7	9.1	10.6	11.9	13.3	14.7	16.0	17.3	18.5	...	...	...
4 x3	...	...	...	7.2	8.5	9.8	11.1	12.4	13.6	14.8	16.0	17.1	...	...	...
3 $\frac{1}{2}$ x3 $\frac{1}{2}$	...	...	...	7.2	8.5	9.8	11.1	12.4	13.6	14.8	16.0	17.1	...	...	...
3 $\frac{1}{2}$ x3	...	...	...	6.6	7.9	9.1	10.2	11.4	12.5	13.6	14.7	15.8	...	...	...
3 $\frac{1}{2}$ x2 $\frac{1}{2}$	...	...	4.9	6.1	7.2	8.3	9.4	10.4	11.5	12.5	...	...	...	...	...
3 $\frac{1}{2}$ x2	...	...	4.3	5.3	6.3	7.2	8.1	9.0	...	...	...	...	...	...	...
3 x3	...	...	4.9	6.1	7.2	8.3	9.4	10.4	11.5	...	...	...	...	...	...
3 x2 $\frac{1}{2}$	...	...	4.5	5.6	6.6	7.6	8.5	9.5	...	...	...	...	...	...	...
3 x2	...	3.1	4.1	5.0	5.9	6.8	7.7	...	...	...	...	...	...	...	...
2 $\frac{3}{4}$ x2 $\frac{3}{4}$	...	...	4.5	5.6	6.6	7.6	8.5	...	...	...	...	...	...	...	...
2 $\frac{1}{2}$ x2 $\frac{1}{2}$	...	3.1	4.1	5.0	5.9	6.8	7.7	...	...	...	...	...	...	...	...
2 $\frac{1}{2}$ x2	...	2.8	3.7	4.5	5.3	6.1	6.8	...	...	...	...	...	...	...	...
2 $\frac{1}{2}$ x1 $\frac{1}{2}$	...	2.4	3.2	3.9	4.6	5.3	6.0	...	...	...	...	...	...	...	...
2 $\frac{1}{2}$ x1 $\frac{1}{4}$	...	2.8	3.7	4.5	5.3	6.1	6.8	...	...	...	...	...	...	...	...
2 $\frac{1}{4}$ x1 $\frac{1}{2}$	...	2.3	3.0	3.7	4.4	5.0	5.6	...	...	...	...	...	...	...	...
2 x2	...	2.5	3.2	4.0	4.7	5.3	...	...	...	...	...	...	...	...	...
2 x1 $\frac{1}{2}$	...	2.1	2.8	3.4	4.0	...	...	...	...	...	...	...	...	...	...
2 x1 $\frac{1}{4}$	...	2.1	2.7	3.3	3.8	...	...	...	...	...	...	...	...	...	...
1 $\frac{3}{4}$ x1 $\frac{3}{4}$	...	2.2	2.8	3.4	4.0	4.6	...	...	...	...	...	...	...	...	...
1 $\frac{3}{4}$ x1 $\frac{1}{2}$	...	2.0	2.6	3.3	3.9	...	...	...	...	...	...	...	...	...	...
1 $\frac{1}{2}$ x1 $\frac{1}{2}$	1.3	1.8	2.4	2.9	3.4	...	...	...	...	...	...	...	...	...	...
1 $\frac{3}{8}$ x1	1.0	..	1.9	...	...	...	...	...	...	...	...	...	...	...	...
1 $\frac{1}{8}$ x $\frac{7}{8}$	1.0	1.4	1.9	...	...	...	...	...	...	...	...	...	...	...	...
1 $\frac{1}{4}$ x1 $\frac{1}{4}$	1.1	1.5	2.0	2.4	...	...	...	...	...	...	...	...	...	...	...
1 $\frac{1}{8}$ x1 $\frac{1}{8}$	0.9	1.3	1.7	2.1	...	...	...	...	...	...	...	...	...	...	...
1 x1	0.8	1.2	1.5	...	...	...	...	...	...	...	...	...	...	...	...
1 x $\frac{3}{4}$	...	1.0	...	...	...	...	...	...	...	...	...	...	...	...	...
1 x $\frac{1}{2}$	0.7	1.0	...	...	...	...	...	...	...	...	...	...	...	...	...
$\frac{7}{8}$ x $\frac{7}{8}$	0.7	1.0	...	...	...	...	...	...	...	...	...	...	...	...	...
$\frac{3}{4}$ x $\frac{3}{4}$	0.6	0.8	...	...	...	...	...	...	...	...	...	...	...	...	...
$\frac{1}{2}$ x $\frac{1}{2}$	0.5	...	...	...	...	...	...	...	...	...	...	...	...	...	...
$\frac{1}{4}$ x $\frac{1}{4}$	0.4	...	...	...	...	...	...	...	...	...	...	...	...	...	...

WEIGHTS AND DIMENSIONS OF REGULAR T-BARS EQUAL LEGS

Width of Flange	Depth of Bar	Thickness of Flange	Thickness of Stem	Weight per Foot	Area of Section
Inches	Inches	Inch	Inch	Pounds	Sq. Ins.
1	1	$\frac{1}{8}$ to $\frac{5}{32}$	$\frac{1}{8}$ to $\frac{5}{32}$	1.0	.27
$1\frac{1}{8}$	$1\frac{1}{8}$	$\frac{3}{16}$ to $\frac{7}{32}$	$\frac{3}{32}$ to $\frac{7}{32}$	1.4	.41
$1\frac{3}{16}$	$1\frac{3}{16}$	$\frac{3}{16}$ to $\frac{1}{4}$	$\frac{5}{32}$ to $\frac{7}{32}$	1.6	.45
$1\frac{1}{4}$	$1\frac{1}{4}$	$\frac{3}{16}$ to $\frac{1}{4}$	$\frac{5}{32}$ to $\frac{1}{4}$	1.7	.48
$1\frac{3}{8}$	$1\frac{3}{8}$	$\frac{3}{16}$ to $\frac{1}{4}$	$\frac{5}{32}$ to $\frac{1}{4}$	1.9	.55
$1\frac{1}{2}$	$1\frac{1}{2}$	$\frac{1}{4}$ to $\frac{5}{16}$	$\frac{1}{4}$ to $\frac{5}{16}$	3.2	.92
2	2	$\frac{1}{4}$ to $\frac{5}{16}$	$\frac{1}{4}$ to $\frac{5}{16}$	3.7	1.07
2	2	$\frac{5}{16}$ to $\frac{3}{8}$	$\frac{5}{16}$ to $\frac{3}{8}$	4.4	1.28
$2\frac{1}{4}$	$2\frac{1}{4}$	$\frac{1}{4}$ to $\frac{5}{16}$	$\frac{1}{4}$ to $\frac{5}{16}$	4.2	1.21
$2\frac{1}{2}$	$2\frac{1}{2}$	$\frac{5}{16}$ to $\frac{3}{8}$	$\frac{5}{16}$ to $\frac{3}{8}$	5.0	1.46
$2\frac{3}{4}$	$2\frac{3}{4}$	$\frac{5}{16}$ to $\frac{3}{8}$	$\frac{5}{16}$ to $\frac{3}{8}$	5.6	1.63
3	3	$\frac{5}{16}$ to $\frac{3}{8}$	$\frac{5}{16}$ to $\frac{3}{8}$	6.8	1.99
3	3	$\frac{3}{8}$ to $\frac{7}{16}$	$\frac{3}{8}$ to $\frac{7}{16}$	7.9	2.31
3	3	$\frac{1}{2}$ to $\frac{9}{16}$	$\frac{1}{2}$ to $\frac{9}{16}$	10.1	2.96
$3\frac{1}{2}$	$3\frac{1}{2}$	$\frac{3}{8}$ to $\frac{7}{16}$	$\frac{3}{8}$ to $\frac{7}{16}$	9.3	2.74
4	4	$\frac{3}{8}$ to $\frac{7}{16}$	$\frac{3}{8}$ to $\frac{7}{16}$	10.9	3.19
4	4	$\frac{1}{2}$ to $\frac{9}{16}$	$\frac{1}{2}$ to $\frac{9}{16}$	13.9	4.08

WEIGHTS AND DIMENSIONS OF REGULAR T-BARS UNEQUAL LEGS

Width of Flange	Depth of Bar	Thickness of Flange	Thickness of Stem	Weight per Foot	Area of Section
Inches	Inches	Inch	Inch	Pounds	Sq. Ins.
$2\frac{1}{2}$	$1\frac{1}{4}$	$\frac{3}{16}$ to $\frac{9}{32}$	$\frac{3}{16}$ to $\frac{5}{16}$	3.0	.86
$2\frac{1}{2}$	3	$\frac{3}{8}$ to $\frac{7}{16}$	$\frac{3}{8}$ to $\frac{7}{16}$	7.2	2.10
$2\frac{3}{4}$	2	$\frac{5}{16}$ to $\frac{3}{8}$	$\frac{23}{32}$ to $\frac{7}{16}$	7.3	2.15
3	$2\frac{1}{2}$	$\frac{3}{8}$ to $\frac{7}{16}$	$\frac{3}{8}$ to $\frac{7}{16}$	7.2	2.11
3	4	$\frac{3}{8}$ to $\frac{7}{16}$	$\frac{3}{8}$ to $\frac{7}{16}$	9.3	2.74
$3\frac{1}{2}$	4	$\frac{3}{8}$ to $\frac{7}{16}$	$\frac{3}{8}$ to $\frac{7}{16}$	10.0	2.94
$4\frac{1}{2}$	$2\frac{1}{2}$	$\frac{5}{16}$ to $\frac{3}{8}$	$\frac{5}{16}$ to $\frac{3}{8}$	8.0	2.29
$4\frac{1}{2}$	3	$\frac{3}{8}$ to $\frac{7}{16}$	$\frac{3}{8}$ to $\frac{7}{16}$	10.0	2.94
$4\frac{1}{2}$	$3\frac{1}{2}$	$\frac{7}{16}$ to $\frac{9}{16}$	$\frac{23}{32}$ to $\frac{7}{16}$	15.2	4.46
$4\frac{1}{2}$	$3\frac{1}{2}$	$\frac{7}{16}$ to $\frac{9}{16}$	$\frac{11}{16}$ to $\frac{7}{8}$	15.9	4.65
5	3	$\frac{1}{2}$ to $\frac{9}{16}$	$\frac{13}{32}$ to $\frac{5}{8}$	13.6	3.99

WEIGHTS AND DIMENSIONS OF Z - BARS

Depth of Bar	Length of Legs	Thickness of Web and Legs	Weight per Foot	Area of Section
Inches	Inches	Inch	Pounds	Sq. Ins.
3	2 $\frac{1}{16}$	$\frac{1}{4}$	6.7	1.97
3 $\frac{1}{16}$	2 $\frac{3}{4}$	$\frac{5}{16}$	8.4	2.48
3	2 $\frac{1}{16}$	$\frac{3}{8}$	9.7	2.86
3 $\frac{1}{16}$	2 $\frac{3}{4}$	$\frac{7}{16}$	11.4	3.36
3	2 $\frac{1}{16}$	$\frac{1}{2}$	12.5	3.69
3 $\frac{1}{16}$	2 $\frac{3}{4}$	$\frac{9}{16}$	14.2	4.18
4	3 $\frac{1}{16}$	$\frac{1}{4}$	8.2	2.41
4 $\frac{1}{16}$	3 $\frac{1}{8}$	$\frac{5}{16}$	10.3	3.03
4 $\frac{1}{8}$	3 $\frac{3}{16}$	$\frac{3}{8}$	12.4	3.66
4	3 $\frac{1}{16}$	$\frac{7}{16}$	13.8	4.05
4 $\frac{1}{16}$	3 $\frac{1}{8}$	$\frac{1}{2}$	15.8	4.66
4 $\frac{1}{8}$	3 $\frac{3}{16}$	$\frac{9}{16}$	17.9	5.27
4	3 $\frac{1}{16}$	$\frac{5}{8}$	18.9	5.55
4 $\frac{1}{16}$	3 $\frac{1}{8}$	$\frac{11}{16}$	20.9	6.14
4 $\frac{1}{8}$	3 $\frac{3}{16}$	$\frac{3}{4}$	23.0	6.75
5	3 $\frac{1}{4}$	$\frac{5}{16}$	11.6	3.40
5 $\frac{1}{16}$	3 $\frac{5}{16}$	$\frac{3}{8}$	13.9	4.10
5 $\frac{1}{8}$	3 $\frac{3}{8}$	$\frac{7}{16}$	16.4	4.81
5	3 $\frac{1}{4}$	$\frac{1}{2}$	17.9	5.25
5 $\frac{1}{16}$	3 $\frac{5}{16}$	$\frac{9}{16}$	20.2	5.94
5 $\frac{1}{8}$	3 $\frac{3}{8}$	$\frac{5}{8}$	22.6	6.64
5	3 $\frac{1}{4}$	$\frac{11}{16}$	23.7	6.96
5 $\frac{1}{16}$	3 $\frac{5}{16}$	$\frac{3}{4}$	26.0	7.64
5 $\frac{1}{8}$	3 $\frac{3}{8}$	$\frac{13}{16}$	28.3	8.33
6	3 $\frac{1}{2}$	$\frac{3}{8}$	15.6	4.59
6 $\frac{1}{16}$	3 $\frac{9}{16}$	$\frac{7}{16}$	18.3	5.39
6 $\frac{1}{8}$	3 $\frac{5}{8}$	$\frac{1}{2}$	21.0	6.19
6	3 $\frac{1}{2}$	$\frac{9}{16}$	22.7	6.68
6 $\frac{1}{16}$	3 $\frac{9}{16}$	$\frac{5}{8}$	25.4	7.46
6 $\frac{1}{8}$	3 $\frac{5}{8}$	$\frac{11}{16}$	28.1	8.25
6	3 $\frac{1}{2}$	$\frac{3}{4}$	29.3	8.63
6 $\frac{1}{16}$	3 $\frac{9}{16}$	$\frac{13}{16}$	31.9	9.39
6 $\frac{1}{8}$	3 $\frac{5}{8}$	$\frac{7}{8}$	34.6	10.17
7 $\frac{1}{2}$	3	$\frac{3}{8}$	16.3	4.78
8	3	$\frac{1}{2}$	22.1	6.5

BEARING PLATES FOR BEAMS AND CHANNELS ON BRICK OR MASONRY

Size of Beam or Channel	Bearing on Wall	Size of Bearing Plates	Weight lbs.	Safe Bearing Values in Tons for Plates Resting on		
				Common Brick	1st Class Brick	Ordinary Masonry
3" 4" 5" & 6"	6" 6"	6"x6"x $\frac{3}{8}$ " 6"x6"x $\frac{1}{2}$ "	4 5	1.8	2.7	4.5
7" & 8"	8" 8"	8"x8"x $\frac{1}{2}$ " 8"x8"x $\frac{3}{4}$ "	9 14	3.2	4.8	8.0
9" & 10"	8" 8"	8"x12"x $\frac{1}{2}$ " 8"x12"x $\frac{3}{4}$ "	14 20	4.8	7.2	12.0
12"—31.5 lbs.	12" 12"	12"x12"x $\frac{1}{2}$ " 12"x12"x $\frac{3}{4}$ "	20 31	7.2	10.8	18.0
12"—40 lbs. & up & 15" 42 lbs.	12" 12"	12"x16"x $\frac{3}{4}$ " 12"x16"x1"	41 54	9.6	14.4	24.0
15" 60 & 80 lbs.	12" 12"	12"x18"x $\frac{3}{4}$ " 12"x18"x1"	46 61	10.8	16.2	27.0
18" 20" 24"	16"	16"x16"x1"	73	12.8	19.2	32.0

Above bearing values are based on the following table:

Allowable load on common brick work,	100 lb per square inch.
" " " 1st class work,	150 lb " " "
" " " masonry,	250 lb " " "

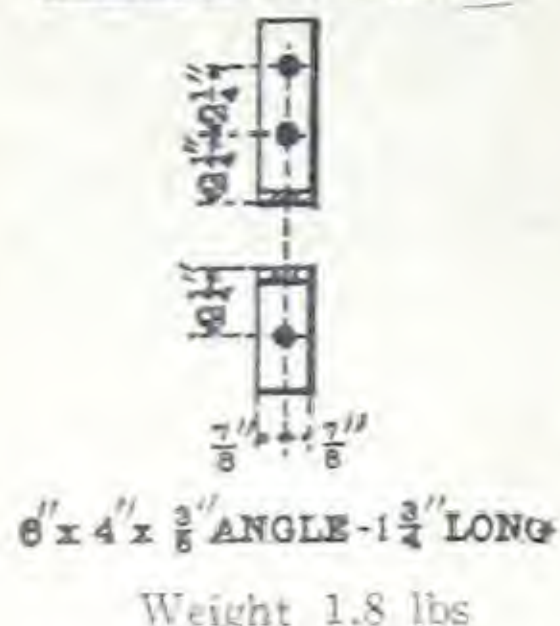
Use the thicker plate for bearing values exceeding those given under common brick work.

When end reaction exceeds the above safe bearing values, special plates will be provided. 20" and 24" beams will usually require special calculations.

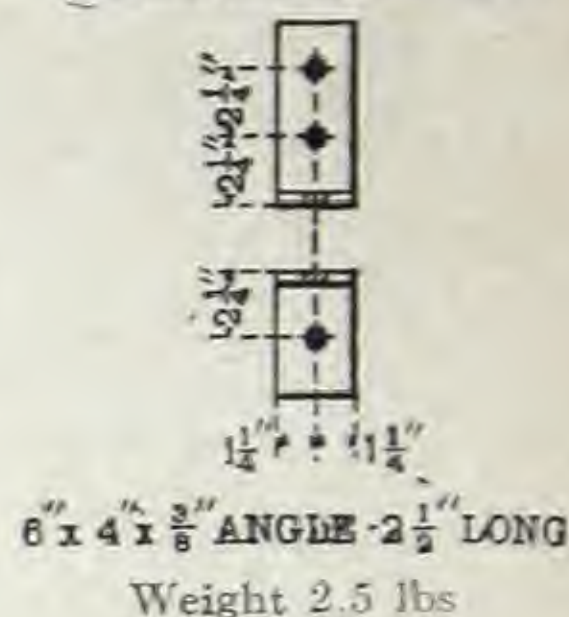
The above table is given only to show the approximate dimensions of bearing plates for different sizes of beams. The correct sizes are always determined by our engineers from the loading data, and may vary somewhat from the sizes shown in above table which are given only for the purpose of estimating costs.

STANDARD CONNECTION ANGLES FOR I-BEAMS AND CHANNELS

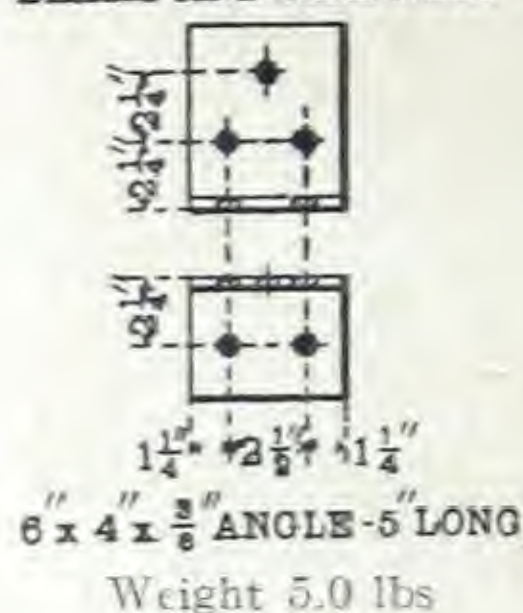
FOR 3" AND 4"
BEAMS AND CHANNELS



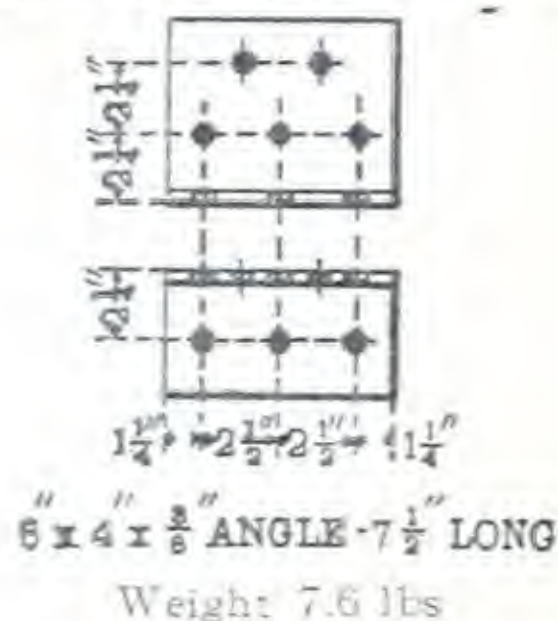
FOR 5" AND 6"
BEAMS AND CHANNELS



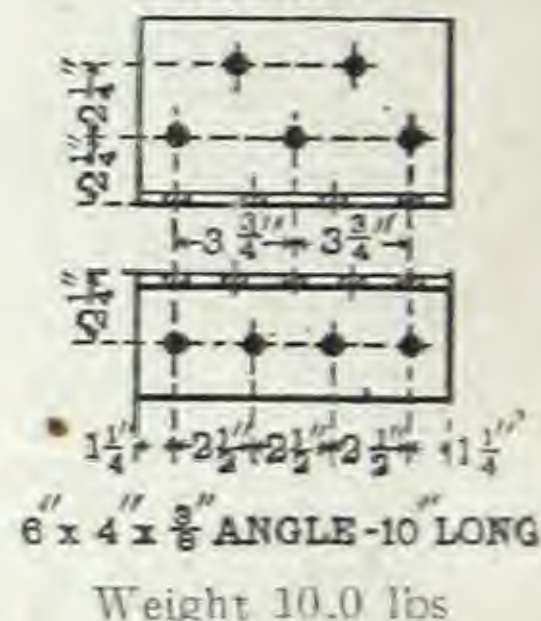
FOR 7", 8", 9" AND 10"
BEAMS AND CHANNELS



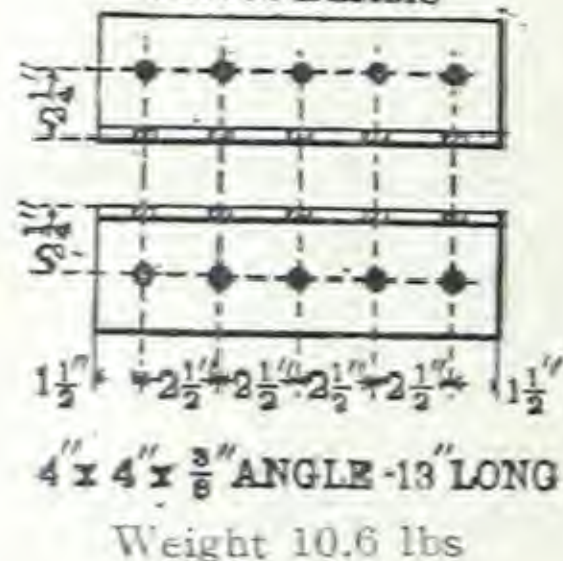
FOR 12" BEAMS AND CHANNELS



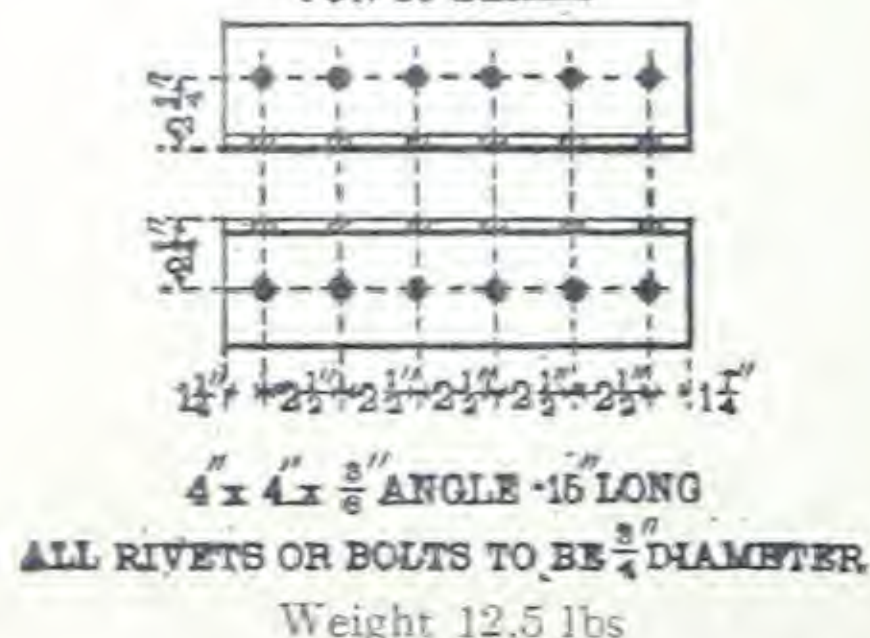
FOR 15" BEAMS AND
CHANNELS



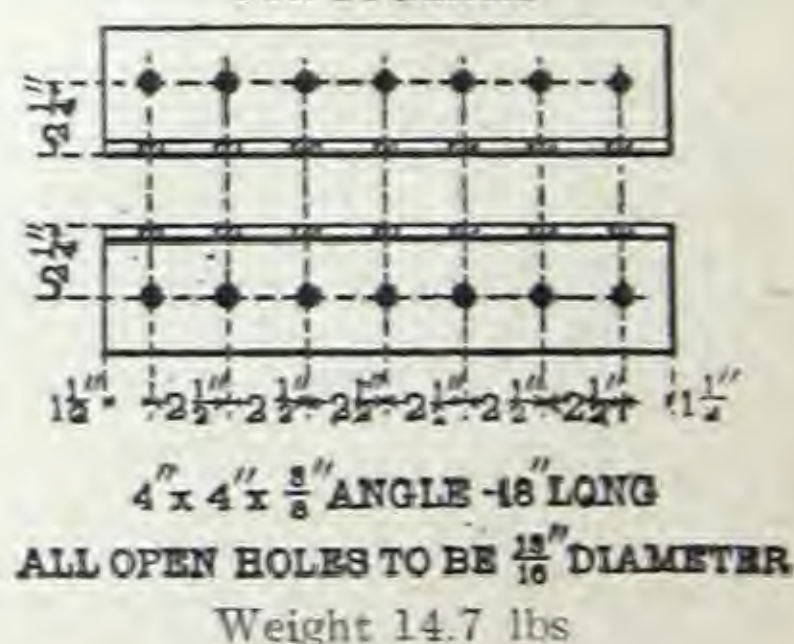
FOR 18" BEAMS



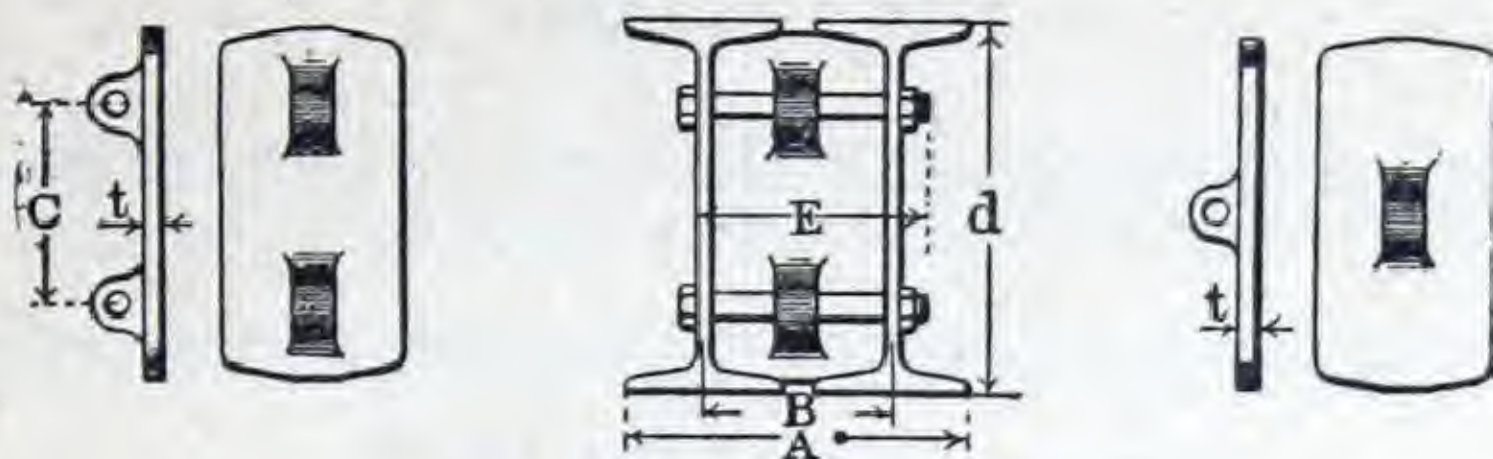
FOR 20" BEAMS



FOR 24" BEAMS



Cast Iron Separators for I - Beams



BEAMS				SEPARATORS			BOLTS Square heads and hexagonal Nuts				
Depth	Weight per foot	Out to out of flanges of Beams	Center to center of Beams	Thickness	Weight	Increase of weight of bolts for each inch additional spread of Beams	Diameter	Center to center of Bolts	Length	Weight of Bolts and Nuts	Increase of weight of Bolts for each inch additional spread of Beams
d		A	B	t				C	E		
Inches	Pounds	Inches	Inches	Inch	Pounds	Pounds	Inch	Inches	Inches	Pounds	Pound

SEPARATORS WITH ONE BOLT

3	5.5	5 $\frac{5}{16}$	3	$\frac{3}{8}$	1.1	.29	$\frac{3}{4}$		4	.95	.123
4	7.5	5 $\frac{7}{8}$	3 $\frac{1}{4}$	$\frac{3}{8}$	1.6	.38	$\frac{3}{4}$		4 $\frac{1}{2}$	1.01	.123
5	9.75	6 $\frac{1}{2}$	3 $\frac{1}{2}$	$\frac{3}{8}$	2.0	.49	$\frac{3}{4}$		4 $\frac{3}{4}$	1.04	.123
6	12.25	7 $\frac{1}{8}$	4	$\frac{1}{2}$	3.3	.78	$\frac{3}{4}$		5 $\frac{1}{4}$	1.11	.123
7	15.0	7 $\frac{7}{8}$	4 $\frac{1}{4}$	$\frac{1}{2}$	3.9	.92	$\frac{3}{4}$		5 $\frac{1}{2}$	1.14	.123
8	18.0	8 $\frac{1}{2}$	4 $\frac{1}{2}$	$\frac{1}{2}$	4.7	1.06	$\frac{3}{4}$		5 $\frac{3}{4}$	1.17	.123
9	21.0	9 $\frac{5}{16}$	5	$\frac{1}{2}$	5.9	1.20	$\frac{3}{4}$		6 $\frac{1}{4}$	1.23	.123
10	25.0	9 $\frac{7}{8}$	5 $\frac{1}{4}$	$\frac{1}{2}$	6.8	1.33	$\frac{3}{4}$		6 $\frac{1}{2}$	1.26	.123
12	31.5	10 $\frac{3}{4}$	5 $\frac{3}{4}$	$\frac{1}{2}$	8.8	1.61	$\frac{3}{4}$		7	1.32	.123
12	40.0	11 $\frac{1}{4}$	6	$\frac{1}{2}$	8.9	1.58	$\frac{3}{4}$		7 $\frac{1}{2}$	1.38	.123

SEPARATORS WITH TWO BOLTS

12	31.5	10 $\frac{3}{4}$	5 $\frac{3}{4}$	$\frac{1}{2}$	9.5	1.61	$\frac{3}{4}$	6 $\frac{1}{2}$	7	2.64	.246
12	40.0	11 $\frac{1}{4}$	6	$\frac{1}{2}$	9.5	1.58	$\frac{3}{4}$	6 $\frac{1}{2}$	7 $\frac{1}{2}$	2.76	.246
15	42.0	11 $\frac{3}{4}$	6 $\frac{1}{4}$	$\frac{1}{2}$	12.5	2.02	$\frac{3}{4}$	7	7 $\frac{3}{4}$	2.82	.246
15	60.0	12 $\frac{3}{4}$	6 $\frac{3}{4}$	$\frac{1}{2}$	13.0	1.97	$\frac{3}{4}$	7	8 $\frac{1}{4}$	2.95	.246
15	80.0	13 $\frac{5}{8}$	7 $\frac{1}{4}$	$\frac{1}{2}$	13.2	1.91	$\frac{3}{4}$	7	9	3.13	.246
18	55.0	12 $\frac{3}{4}$	6 $\frac{3}{4}$	$\frac{5}{8}$	19.8	2.41	$\frac{3}{4}$	9	8 $\frac{1}{4}$	2.95	.246
20	65.0	13 $\frac{1}{4}$	7	$\frac{5}{8}$	22.9	3.37	$\frac{3}{4}$	10	8 $\frac{1}{2}$	3.01	.246
20	80.0	14 $\frac{3}{4}$	7 $\frac{3}{4}$	$\frac{5}{8}$	24.6	3.34	$\frac{3}{4}$	10	9 $\frac{1}{4}$	3.19	.246
24	80.0	14 $\frac{3}{4}$	7 $\frac{3}{4}$	$\frac{5}{8}$	30.3	4.07	$\frac{3}{4}$	12	9 $\frac{1}{4}$	3.19	.246

Lengths and weights of separator bolts in above table are for girders composed of two beams of minimum section as shown. Lengths of bolts for intermediate and maximum sizes of beams may be obtained by adding twice the increase of web thickness to the lengths given.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR I-BEAMS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of beam. Safety factor 4.

STANDARD I-BEAMS							
Distance between supports in feet.	3 Inch			4 Inch			
	5.5	6.5	7.5	7.5	8.5	9.5	10.5
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
4	4410	4780	5180	7950	8470	9000	9520
5	3530	3830	4140	6360	6780	7200	7610
6	2940	3190	3450	5300	5650	6000	6350
7	2520	2730	2960	4540	4840	5140	5440
8	2210	2390	2590	3980	4240	4500	4760
9	1960	2130	2300	3530	3770	4000	4230
10	1770	1910	2070	3180	3390	3600	3810
11	1600	1740	1880	2890	3080	3270	3460
12	1470	1590	1730	2650	2820	3000	3170
13	1360	1470	1590	2450	2610	2770	2930
14	1260	1370	1480	2270	2420	2570	2720
15	1180	1280	1380	2120	2260	2400	2540
16	1100	1200	1290	1990	2120	2250	2380
17	1040	1130	1220	1870	1990	2120	2240
18	980	1060	1150	1770	1880	2000	2120
19	930	1010	1090	1670	1780	1890	2000
20	880	960	1040	1590	1690	1800	1900
21	840	910	990	1510	1610	1710	1810

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR I-BEAMS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of beam. Safety factor 4.

Distance between supports in feet.	STANDARD I-BEAMS					
	5 Inch			6 Inch		
	9.75 lbs.	12.25 lbs.	14.75 lbs.	12.25 lbs.	14.75 lbs.	17.25 lbs.
4	12900	14520	16160	19370	21320	23280
5	10320	11620	12930	15490	17050	18620
6	8600	9680	10770	12910	14210	15520
7	7370	8300	9230	11070	12180	13300
8	6450	7260	8080	9680	10660	11640
9	5730	6460	7180	8610	9470	10350
10	5160	5810	6460	7750	8530	9310
11	4690	5280	5880	7040	7750	8460
12	4300	4840	5390	6460	7110	7760
13	3970	4470	4970	5960	6560	7160
14	3680	4150	4620	5530	6090	6650
15	3440	3870	4310	5160	5680	6210
16	3220	3630	4040	4840	5330	5820
17	3030	3420	3800	4560	5020	5480
18	2870	3230	3590	4300	4740	5170
19	2720	3060	3400	4080	4490	4900
20	2580	2900	3230	3870	4260	4660
21	2460	2770	3080	3690	4060	4430
22	2340	2640	2940	3520	3880	4230
23	2240	2530	2810	3370	3710	4050
24	2150	2420	2690	3230	3550	3880
25	2060	2320	2590	3100	3410	3720
26	1980	2230	2490	2980	3280	3580
27	1910	2150	2390	2870	3160	3450
28	.....	.....	.....	2770	3050	3330
29	.....	.....	.....	2670	2940	3210

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR I-BEAMS

Safe loads below are figured from fibre stress of 16,000 pounds per square inch and include weight of beam. Safety factor 4.

Distance between supports in feet.	STANDARD I-BEAMS						
	7 Inch			8 Inch			
	15	17.5	20	18.00	20.25	22.75	25.25
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
4	27600	29850	32140	37920	40130	42740	45360
5	22080	23880	25710	30330	32100	34190	36290
6	18400	19900	21430	25280	26750	28500	30240
7	15770	17060	18370	21670	22930	24420	25920
8	13800	14930	16070	18960	20060	21370	22680
9	12270	13270	14280	16850	17830	19000	20160
10	11040	11940	12860	15170	16050	17100	18140
11	10040	10860	11690	13790	14590	15540	16490
12	9200	9950	10710	12640	13380	14250	15120
13	8490	9190	9890	11670	12350	13150	13960
14	7890	8530	9180	10830	11470	12210	12960
15	7360	7960	8570	10110	10700	11400	12100
16	6900	7460	8030	9480	10030	10690	11340
17	6490	7020	7560	8920	9440	10060	10670
18	6130	6630	7140	8430	8920	9500	10080
19	5810	6280	6770	7980	8450	9000	9550
20	5520	5970	6430	7580	8030	8550	9070
21	5260	5690	6120	7220	7640	8140	8640
22	5020	5430	5840	6890	7300	7770	8250
23	4800	5190	5590	6590	6980	7430	7890
24	4600	4980	5360	6320	6690	7120	7560
25	4420	4780	5140	6070	6420	6840	7260
26	4250	4590	4940	5830	6170	6580	6980
27	4090	4420	4760	5620	5940	6330	6720
28	3940	4260	4590	5420	5730	6110	6480
29	3810	4120	4430	5230	5530	5900	6260

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR I-BEAMS

Safe loads below are figured for fibre stress of 16000 pounds per square inch and include weight of beam. Safety factor 4

Distance between supports in feet.	STANDARD I-BEAM							
	9 Inch				10 Inch			
	21 lbs.	25 lbs.	30 lbs.	35 lbs.	25 lbs.	30 lbs.	35 lbs.	40 lbs.
8	25160	27240	30180	33120	.....	.....	.....	.....
9	22370	24210	26830	29440	.....	.....	.....	.....
10	20130	21790	24150	26500	26050	28620	31240	33850
11	18300	19810	21950	24090	23680	26320	28400	30780
12	16770	18160	20120	22080	21710	24550	26030	28210
13	15480	16760	18570	20380	20040	23020	24030	26040
14	14380	15570	17250	18930	18610	21450	22310	24180
15	13420	14530	16100	17670	17360	20080	20830	22570
16	12580	13620	15090	16560	16280	18390	19520	21160
17	11840	12820	14200	15590	15320	17140	18380	19910
18	11180	12110	13410	14720	14470	16000	17350	18810
19	10590	11470	12710	13950	13710	15070	16440	17820
20	10064	10900	12070	13250	13020	14310	15620	16930
21	9590	10380	11500	12620	12400	13630	14880	16120
22	9150	9910	10980	12050	11840	13010	14200	15390
23	8750	9480	10500	11520	11320	12450	13580	14720
24	8390	9080	10060	11040	10850	11930	13020	14110
25	8050	8720	9660	10600	10420	11450	12500	13540
26	7740	8380	9290	10190	10020	11010	12020	13020
27	7460	8070	8940	9810	9650	10600	11570	12540
28	7190	7780	8620	9460	9300	10320	11160	12090
29	6940	7510	8330	9140	8980	10070	10770	11670
30	6710	7260	8050	8830	8680	9840	10410	11280
31	6490	7030	7790	8550	8400	9630	10080	10920
32	.....	.....	.....	.....	8140	9050	9760	10580
33	.....	.....	.....	.....	7890	8770	9470	10260

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{16}$ in.

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR I-BEAMS

Safe loads below are figured from fibre stress of 16,000 pounds per square inch and include weight of beam. Safety factor 4.

Distance between supports in feet.	STANDARD I-BEAMS						
	7 Inch			8 Inch			
	15 lbs.	17.5 lbs.	20 lbs.	18.00 lbs.	20.25 lbs.	22.75 lbs.	25.25 lbs.
4	27600	29850	32140	37920	40130	42740	45360
5	22080	23880	25710	30330	32100	34190	36290
6	18400	19900	21430	25280	26750	28500	30240
7	15770	17060	18370	21670	22930	24420	25920
8	13800	14930	16070	18960	20060	21370	22680
9	12270	13270	14280	16850	17830	19000	20160
10	11040	11940	12860	15170	16050	17100	18140
11	10040	10860	11690	13790	14590	15540	16490
12	9200	9950	10710	12640	13380	14250	15120
13	8490	9190	9890	11670	12350	13150	13960
14	7890	8530	9180	10830	11470	12210	12960
15	7360	7960	8570	10110	10700	11400	12100
16	6900	7460	8030	9480	10030	10690	11340
17	6490	7020	7560	8920	9440	10060	10670
18	6130	6630	7140	8430	8920	9500	10080
19	5810	6280	6770	7980	8450	9000	9550
20	5520	5970	6430	7580	8030	8550	9070
21	5260	5690	6120	7220	7640	8140	8640
22	5020	5430	5840	6890	7300	7770	8250
23	4800	5190	5590	6590	6980	7430	7890
24	4600	4980	5360	6320	6690	7120	7560
25	4420	4780	5140	6070	6420	6840	7260
26	4250	4590	4940	5830	6170	6580	6980
27	4090	4420	4760	5620	5940	6330	6720
28	3940	4260	4590	5420	5730	6110	6480
29	3810	4120	4430	5230	5530	5900	6260

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR I-BEAMS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of beam. Safety factor 4.

Distance between supports in feet.	STANDARD I-BEAMS							
	9 Inch				10 Inch			
	21 lbs.	25 lbs.	30 lbs.	35 lbs.	25 lbs.	30 lbs.	35 lbs.	40 lbs.
8	25160	27240	30180	33120	.....	.....	.....	.....
9	22370	24210	26830	29440	.....	.....	.....	.....
10	20130	21790	24150	26500	26050	28620	31240	33850
11	18300	19810	21950	24090	23680	26020	28400	30780
12	16770	18160	20120	22080	21710	23850	26030	28210
13	15480	16760	18570	20380	20040	22020	24030	26040
14	14380	15570	17250	18930	18610	20450	22310	24180
15	13420	14530	16100	17670	17360	19080	20830	22570
16	12580	13620	15090	16560	16280	17890	19520	21160
17	11840	12820	14200	15590	15320	16840	18380	19910
18	11180	12110	13410	14720	14470	15900	17350	18810
19	10590	11470	12710	13950	13710	15070	16440	17820
20	10064	10900	12070	13250	13020	14310	15620	16930
21	9590	10380	11500	12620	12400	13630	14880	16120
22	9150	9910	10980	12050	11840	13010	14200	15390
23	8750	9480	10500	11520	11320	12450	13580	14720
24	8390	9080	10060	11040	10850	11930	13020	14110
25	8050	8720	9660	10600	10420	11450	12500	13540
26	7740	8380	9290	10190	10020	11010	12020	13020
27	7460	8070	8940	9810	9650	10600	11570	12540
28	7190	7780	8620	9460	9300	10220	11160	12090
29	6940	7510	8330	9140	8980	9870	10770	11670
30	6710	7260	8050	8830	8680	9540	10410	11280
31	6490	7030	7790	8550	8400	9230	10080	10920
32	.....	.....	.....	.....	8140	8950	9760	10580
33	.....	.....	.....	.....	7890	8670	9470	10260

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

When ordering or asking for prices, read carefully "Instructions to Buyer" on page 216

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR I-BEAMS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of beam. Safety factor 4.

Distance between supports in feet.	STANDARD I-BEAMS			SPECIAL I-BEAMS		
	12 Inch			12 Inch		
	31.5 lbs.	35 lbs.	40 lbs.	45 lbs.	50 lbs.	55 lbs.
10	38370	40580	43720	50790	53930	57070
11	34880	36890	39740	46180	49030	51880
12	31970	33820	36430	42330	44940	47560
13	29510	31220	33630	39070	41480	43900
14	27400	28990	31230	36280	38520	40760
15	25580	27050	29140	33860	35950	38040
16	23980	25360	27320	31750	33710	35670
17	22570	23870	25720	29880	31720	33570
18	21310	22540	24290	28220	29960	31700
19	20190	21360	23010	26730	28380	30040
20	19180	20290	21860	25400	26960	28530
21	18270	19320	20820	24190	25680	27170
22	17440	18450	19870	23090	24510	25940
23	16680	17640	19010	22080	23450	24810
24	15990	16910	18220	21160	22470	23780
25	15350	16230	17490	20320	21570	22830
26	14760	15610	16810	19540	20740	21950
27	14210	15030	16190	18810	19970	21140
28	13700	14490	15610	18140	19260	20380
29	13230	13990	15070	17510	18600	19680
30	12790	13530	14570	16930	17980	19020
31	12380	13090	14100	16380	17400	18410
32	11990	12680	13660	15870	16850	17830
33	11630	12300	13250	15390	16340	17290
34	11280	11940	12860	14940	15860	16780
35	10960	11590	12490	14510	15410	16300
36	10660	11270	12140	14110	14980	15850

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR I-BEAMS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of beam. Safety factor 4.

Distance between supports in feet.	STANDARD I-BEAMS				
	15 Inch				
	42 lbs.	45 lbs.	50 lbs.	55 lbs.	60 lbs.
10	62830	64830	68750	72670	76600
11	57120	58940	62500	66070	69630
12	52360	54030	57290	60560	63830
13	48330	49870	52890	55900	58920
14	44880	46310	49110	51910	54710
15	41880	43220	45840	48450	51060
16	39270	40520	42970	45420	47870
17	36960	38140	40440	42750	45060
18	34900	36020	38200	40370	42550
19	33070	34120	36190	38250	40310
20	31410	32420	34380	36340	38300
21	29920	30870	32740	34610	36470
22	28560	29470	31250	33030	34820
23	27320	28190	29890	31600	33300
24	26180	27010	28650	30280	31910
25	25130	25930	27500	29070	30640
26	24160	24940	26440	27950	29460
27	23270	24010	25460	26920	28370
28	22440	23150	24550	25960	27360
29	21660	22360	23710	25060	26410
30	20940	21610	22920	24220	25530
31	20270	20910	22180	23440	24710
32	19630	20260	21490	22710	23940
33	19040	19650	20830	22020	23210
34	18480	19070	20220	21370	22530
35	17950	18520	19640	20760	21880
36	17450	18010	19100	20190	21280

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR I-BEAMS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of beam. Safety factor 4.

Distance between supports in feet.	SPECIAL I-BEAM			
	15 Inch			
	65 lbs.	70 lbs.	75 lbs.	80 lbs.
10	90470	94390	98310	102230
11	82240	85810	89370	92940
12	75390	78660	81920	85190
13	69590	72610	75620	78640
14	64620	67420	70220	73020
15	60310	62920	65540	68150
16	56540	58990	61440	63890
17	53220	55520	57830	60140
18	50260	52440	54620	56790
19	47610	49680	51740	53810
20	45230	47190	49150	51120
21	43080	44950	46810	48680
22	41120	42900	44690	46470
23	39330	41040	42740	44450
24	37690	39330	40960	42600
25	36190	37750	39320	40890
26	34790	36300	37810	39320
27	33510	34960	36410	37860
28	32310	33710	35110	36510
29	31200	32550	33900	35250
30	30160	31460	32770	34080
31	29180	30450	31710	32980
32	28270	29500	30720	31950
33	27410	28600	29790	30980
34	26610	27760	28910	30070
35	25850	26970	28090	29210
36	25130	26220	27310	28400

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR I-BEAMS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of beam. Safety factor 4.

Distance between supports in feet.	SPECIAL I-BEAM			
	15 Inch			
	85 lbs.	90 lbs.	95 lbs.	100 lbs.
10	116030	119960	123880	127800
11	105490	109050	112620	116180
12	96700	99960	103230	106500
13	89260	92270	95290	98310
14	82880	85680	88480	91280
15	77360	79970	82580	85200
16	72520	74970	77420	79870
17	68260	70560	72870	75180
18	64460	66640	68820	71000
19	61070	63130	65200	67260
20	58020	59980	61940	63900
21	55250	57120	58990	60860
22	52740	54530	56310	58090
23	50450	52150	53860	55560
24	48350	49980	51620	53250
25	46410	47980	49550	51120
26	44630	46140	47650	49150
27	42980	44430	45880	47330
28	41440	42840	44240	45640
29	40010	41360	42720	44070
30	38680	39990	41290	42600
31	37430	38700	39960	41230
32	36260	37490	38710	39940
33	35160	36350	37540	38730
34	34130	35280	36430	37590
35	33150	34270	35390	36510
36	32230	33320	34410	35500

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR I-BEAMS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of beam. Safety factor 4.

Distance between supports in feet.	STANDARD I-BEAMS						
	18 Inch				20 Inch		
	55	60	65	70	65	70	75
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
10	94290	99770	104470	109180	124750	130110	135340
11	85720	90700	94980	99250	113410	118280	123040
12	78570	83140	87060	90980	103960	108430	112780
13	72530	76740	80360	83980	95960	100090	104110
14	67350	71260	74620	77990	89110	92940	96670
15	62860	66510	69650	72790	83170	86740	90230
16	58930	62360	65300	68240	77970	81320	84590
17	55460	58650	61460	64220	73380	76540	79610
18	52380	55430	58040	60660	69310	72280	75190
19	49630	52510	54990	57460	65660	68480	71230
20	47140	49880	52240	54590	62370	65060	67670
21	44900	47510	49750	51990	59400	61960	64450
22	42860	45350	47490	49630	56700	59140	61520
23	40990	43380	45420	47470	54240	56570	58840
24	39290	41570	43530	45490	51980	54210	56390
25	37720	39910	41790	43670	49900	52040	54140
26	36260	38370	40180	41990	47980	50040	52050
27	34920	36950	38690	40440	46200	48190	50130
28	33670	35630	37310	38990	44550	46470	48340
29	32510	34400	36030	37650	43020	44870	46670
30	31430	33260	34820	36390	41580	43370	45110
31	30420	32180	33700	35220	40240	41970	43660
32	29460	31200	32650	34120	38980	40660	42290
33	28570	30230	31660	33080	37800	39430	41010
34	27730	29340	30730	32110	36690	38270	39810
35	26940	28510	29850	31190	35640	37170	38670
36	26190	27710	29020	30330	34650	36140	37590

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR I-BEAMS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of beam. Safety factor 4.

Distance between supports in feet.	SPECIAL I-BEAM				
	20 Inch				
	80 lbs.	85 lbs.	90 lbs.	95 lbs.	100 lbs.
10	156410	160910	166140	171370	176600
11	142190	146280	151040	155790	160540
12	130340	134090	138450	142810	147160
13	120310	123780	127800	131820	135840
14	111720	114940	118670	122410	126140
15	104270	107270	110760	114250	117730
16	97750	100570	103840	107100	110370
17	92000	94650	97730	100800	103880
18	86890	89390	92300	95200	98110
19	82320	84690	87440	90190	92950
20	78200	80460	83070	85680	88300
21	74480	76620	79110	81600	84090
22	71090	73140	75520	77890	80270
23	68000	69960	72230	74510	76780
24	65170	67050	69220	71400	73580
25	62560	64360	66460	68550	70640
26	60160	61890	63900	65910	67920
27	57930	59600	61530	63470	65410
28	55860	57470	59340	61200	63070
29	53930	55490	57290	59090	60900
30	52140	53640	55380	57120	58870
31	50450	51910	53590	55280	56970
32	48880	50280	51920	53550	55190
33	47400	48760	50350	51930	53510
34	46000	47330	48860	50400	51940
35	44690	45970	47470	48960	50460
36	43450	44700	46150	47600	49050

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR I-BEAMS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of beam. Safety factor 4.

Distance between supports in feet.	STANDARD I-BEAM				
	24 Inch				
	80 lbs.	85 lbs.	90 lbs.	95 lbs.	100 lbs.
10	185530	192700	198970	205240	211520
11	168660	175180	180880	186590	192290
12	154610	160580	165810	171040	176270
13	142720	148230	153050	157880	162710
14	132520	137640	142120	146600	151080
15	123690	128460	132650	136830	141010
16	115960	120430	124360	128280	132200
17	109140	113350	117040	120730	124420
18	103070	107050	110540	114020	117510
19	97650	101420	104720	108020	111330
20	92770	96350	99480	102620	105760
21	88350	91760	94750	97740	100720
22	84330	87590	90440	93290	96140
23	80670	83780	86510	89240	91960
24	77300	80290	82900	85520	88130
25	74210	77080	79590	82100	84610
26	71360	74110	76530	78940	81350
27	68720	71370	73690	76020	78340
28	66260	68820	71060	73300	75540
29	63980	66450	68610	70770	72940
30	61840	64230	66320	68410	70510
31	59850	62160	64180	66210	68230
32	57980	60220	62180	64140	66100
33	56220	58390	60290	62200	64100
34	54570	56680	58520	60370	62210
35	53010	55060	56850	58640	60430
36	51540	53530	55270	57010	58760

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR CHANNELS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of channel. Safety factor 4.

Distance between supports in feet.	STANDARD CHANNELS								
	3 Inch			4 Inch			5 Inch		
	4 lbs.	5 lbs.	6 lbs.	5.25 lbs.	6.25 lbs.	7.25 lbs.	6.5 lbs.	9 lbs.	11.5 lbs.
4	2910	3290	3680	5060	5570	6090	7910	9460	11100
5	2330	2630	2940	4050	4450	4870	6330	7570	8880
6	1940	2190	2450	3370	3710	4060	5270	6310	7400
7	1660	1880	2100	2890	3180	3480	4520	5410	6340
8	1450	1640	1840	2530	2780	3050	3960	4730	5550
9	1290	1460	1630	2250	2470	2510	3520	4210	4930
10	1160	1310	1470	2020	2230	2440	3160	3790	4440
11	1060	1190	1340	1840	2020	2210	2880	3440	4040
12	970	1100	1230	1690	1860	2030	2640	3150	3700
13	890	1010	1130	1560	1710	1870	2430	2910	3410
14	830	940	1050	1440	1590	1740	2260	2700	3170
15	780	880	980	1350	1480	1620	2110	2520	2960
16	730	820	920	1260	1390	1520	1980	2370	2770
17	680	770	870	1190	1310	1430	1860	2230	2610
18	650	730	820	1120	1240	1350	1760	2100	2470
19	610	690	770	1060	1170	1280	1670	1990	2340
20	580	660	740	1010	1110	1220	1580	1890	2220
21	550	630	700	960	1060	1160	1510	1800	2110
22	530	600	670	920	1010	1110	1440	1720	2020
23	510	570	640	880	970	1060	1380	1650	1930
24	480	550	610	840	930	1020	1320	1580	1850
25	470	530	590	810	890	970	1270	1510	1780

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR CHANNELS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of channel. Safety factor 4.

Distance between supports in feet.	STANDARD CHANNELS								
	6 Inch				7 Inch				
	8 lbs.	10.5 lbs.	13 lbs.	15.5 lbs.	9.75 lbs.	12.25 lbs.	12.25 lbs.	17.25 lbs.	19.75 lbs.
4	11550	13440	15400	17360	16070	18410	20700	22990	25280
5	9240	10750	12320	13890	12850	14730	16560	18390	20220
6	7700	8960	10270	11570	10710	12280	13800	15330	16850
7	6600	7680	8800	9920	9180	10520	11830	13140	14440
8	5780	6720	7700	8680	8030	9210	10350	11490	12640
9	5130	5970	6840	7720	7140	8180	9200	10220	11230
10	4620	5380	6160	6940	6430	7370	8280	9200	10110
11	4200	4890	5600	6310	5840	6700	7530	8360	9190
12	3850	4480	5130	5790	5360	6140	6900	7660	8430
13	3550	4130	4740	5340	4940	5670	6370	7070	7780
14	3300	3840	4400	4960	4590	5260	5910	6570	7220
15	3080	3580	4110	4630	4280	4910	5520	6130	6740
16	2890	3360	3850	4340	4020	4600	5180	5750	6320
17	2720	3160	3620	4080	3780	4330	4870	5410	5950
18	2570	2990	3420	3860	3570	4090	4600	5110	5620
19	2430	2830	3240	3650	3380	3880	4360	4840	5320
20	2310	2690	3080	3470	3210	3680	4140	4600	5060
21	2200	2560	2930	3310	3060	3510	3940	4380	4810
22	2100	2440	2800	3160	2920	3350	3760	4180	4600
23	2010	2340	2680	3020	2790	3200	3600	4000	4400
24	1930	2240	2570	2890	2680	3070	3450	3830	4210
25	1850	2150	2460	2780	2570	2950	3310	3680	4040

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR CHANNELS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of channel. Safety factor 4.

Distance between supports in feet.	STANDARD CHANNELS								
	8 Inch					9 Inch			
	11.25 lbs.	13.75 lbs.	16.25 lbs.	18.75 lbs.	21.25 lbs.	13.25 lbs.	15 lbs.	20 lbs.	25 lbs.
4	21530	24000	26610	29230	31840	28040	30130	36020	41900
5	17230	19200	21290	23380	25470	22430	24110	28810	33520
6	14360	16000	17740	19480	21230	18690	20090	24010	27930
7	12310	13710	15210	16700	18200	16020	17220	20580	23940
8	10770	12000	13310	14610	15920	14020	15070	18010	20950
9	9570	10670	11830	12990	14150	12460	13390	16010	18620
10	8610	9600	10650	11690	12740	11220	12050	14410	16760
11	7830	8730	9680	10630	11580	10200	10960	13100	15240
12	7180	8000	8870	9740	10610	9350	10040	12010	13970
13	6630	7380	8190	8990	9800	8630	9270	11080	12890
14	6150	6860	7600	8350	9100	8010	8610	10290	11970
15	5740	6400	7100	7790	8490	7480	8040	9600	11170
16	5380	6000	6650	7310	7960	7010	7530	9000	10470
17	5070	5650	6260	6880	7490	6600	7090	8470	9860
18	4790	5330	5910	6490	7080	6230	6700	8000	9310
19	4530	5050	5600	6150	6700	5900	6340	7580	8820
20	4310	4800	5320	5850	6370	5610	6030	7200	8380
21	4100	4570	5070	5570	6070	5340	5740	6860	7980
22	3920	4360	4840	5310	5790	5100	5480	6550	7620
23	3750	4170	4630	5080	5540	4880	5240	6260	7290
24	3590	4000	4440	4870	5310	4670	5020	6000	6980
25	3450	3840	4260	4680	5090	4490	4820	5760	6700

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR CHANNELS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of channel. Safety factor 4.

Distance between supports in feet.	STANDARD CHANNELS				
	10 Inch				
	15 lbs.	20 lbs.	25 lbs.	30 lbs.	35 lbs.
10	14270	16790	19410	22020	24640
11	12970	15270	17640	20020	22400
12	11890	14000	16170	18350	20530
13	10980	12920	14930	16940	18950
14	10190	12000	13860	15730	17600
15	9510	11200	12940	14680	16430
16	8920	10500	12130	13760	15400
17	8390	9880	11420	12950	14490
18	7930	9330	10780	12240	13690
19	7510	8840	10220	11590	12970
20	7130	8400	9700	11010	12320
21	6790	8000	9240	10490	11730
22	6490	7630	8820	10010	11200
23	6200	7300	8440	9580	10710
24	5940	7000	8090	9180	10270
25	5710	6720	7760	8810	9860
26	5490	6460	7460	8470	9480
27	5280	6220	7190	8160	9130
28	5100	6000	6930	7870	8800
29	4920	5790	6690	7590	8500
30	4760	5600	6470	7340	8210

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR CHANNELS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of channel. Safety factor 4.

Distance between supports in feet.	STANDARD CHANNELS				
	12 Inch				
	20.5 lbs.	25 lbs.	30 lbs.	35 lbs.	40 lbs.
10	22780	25600	28740	31870	35010
11	20700	23270	26120	28980	31830
12	18980	21330	23950	26560	29180
13	17520	19690	22110	24520	26930
14	16270	18290	20530	22770	25010
15	15180	17070	19160	21250	23340
16	14230	16000	17960	19920	21880
17	13400	15060	16900	18750	20600
18	12650	14220	15970	17710	19450
19	11990	13470	15120	16780	18430
20	11390	12800	14370	15940	17510
21	10850	12190	13680	15180	16670
22	10350	11640	13060	14490	15910
23	9900	11130	12490	13860	15220
24	9490	10670	11970	13280	14590
25	9110	10240	11490	12750	14000
26	8760	9850	11050	12260	13470
27	8440	9480	10640	11810	12970
28	8130	9140	10260	11380	12500
29	7850	8830	9910	10990	12070
30	7590	8530	9580	10620	11670

For safe loads below the heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR CHANNELS.

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of channel. Safety factor 4,

Distance between supports in feet.	STANDARD CHANNELS					
	15 Inch					
	33 lbs.	35 lbs.	40 lbs.	45 lbs.	50 lbs.	55 lbs.
10	44450	45500	49420	53350	57270	61190
11	40410	41370	44930	48500	52060	55630
12	37040	37920	41190	44460	47720	50990
13	34190	35000	38020	41040	44050	47070
14	31750	32500	35300	38100	40910	43710
15	29630	30340	32950	35560	38180	40790
16	27780	28440	30890	33340	35790	38240
17	26150	26770	29070	31380	33690	35990
18	24700	25280	27460	29640	31820	33990
19	23400	23950	26010	28080	30140	32210
20	22230	22750	24710	26670	28630	30590
21	21170	21670	23540	25400	27270	29140
22	20210	20680	22470	24250	26030	27810
23	19330	19780	21490	23190	24900	26600
24	18520	18960	20590	22230	23860	25500
25	17780	18200	19770	21340	22910	24480
26	17100	17500	19010	20520	22030	23530
27	16460	16850	18310	19760	21210	22660
28	15880	16250	17650	19050	20450	21850
29	15330	15690	17040	18400	19750	21100
30	14820	15170	16470	17780	19090	20400

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED FOR T-BARS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of T-Bar.

EQUAL LEGS

Width of Flange	Depth of Bar	Wei't per Foot	Distance Between Supports in Feet										
			2	3	4	5	6	7	8	9	10	11	12
1	1	1.0	180	120	90	70	60	50	40	.....	.....	.....	.....
1½	1½	1.4	280	190	140	110	90	80	70	60	.....	.....	.....
1½	1½	1.6	320	210	160	130	110	90	80	70	.....	.....	.....
1½	1½	1.7	350	230	180	140	120	100	90	80	.....	.....	.....
1½	1½	1.9	450	300	220	180	150	130	110	100	.....	.....	.....
1½	1½	3.2	1040	690	520	410	340	290	260	230	200	180	.....
2	2	3.7	1390	920	690	550	460	400	350	310	280	250	.....
2	2	4.4	1670	1110	830	670	560	480	420	370	330	300	.....
2½	2½	4.2	1720	1150	860	690	570	490	430	380	340	310	290
2½	2½	5.0	2150	1430	1070	860	720	610	540	480	430	390	360
2½	2½	5.6	2630	1750	1310	1050	880	750	660	580	530	480	440
3	3	6.8	3930	2620	1970	1570	1310	1120	980	870	790	720	660
3	3	7.9	4590	3060	2300	1840	1530	1310	1150	1020	920	840	770
3	3	10.1	5850	3900	2930	2340	1950	1670	1460	1300	1170	1060	980
3½	3½	9.3	6570	4380	3290	2630	2190	1880	1640	1460	1310	1200	1100
4	4	10.5	8430	5620	4210	3370	2810	2410	2110	1870	1690	1530	1400
4	4	13.9	10800	7200	5400	4320	3600	3080	2700	2400	2160	1960	1800

UNEQUAL LEGS

2½	1½	3.0	470	310	230	190	160	130	120	100	.....	.....	.....
2½	3	7.0	4470	2980	2230	1790	1490	1280	1120	990	890	810	740
2½	2	7.3	3390	2260	1690	1350	1130	970	850	750	680	620	560
3	2½	7.2	3200	2130	1600	1280	1070	910	800	710	640	580	530
4½	2½	7.8	2880	1920	1440	1150	960	820	720	640	580	520	480
4½	3	10.0	4840	3230	2420	1940	1610	1380	1210	1070	970	880	800
4½	3½	15.2	11220	7480	5610	4490	3740	3200	2800	2390	2240	2040	1870
4½	3½	15.9	11340	7560	5670	4540	3780	3240	2840	2520	2270	2060	1890
5	3	13.6	5670	3780	2840	2270	1890	1620	1420	1260	1130	1030	950
3	4	9.3	8050	5360	4020	3220	2680	2300	2010	1790	1610	1460	1340
3½	4	10.0	8240	5490	4120	3290	2750	2350	2060	1830	1650	1500	1370

For safe loads to the right of heavy lines, the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous Tables

SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED
FOR Z - BARS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of Z-bar.

STANDARD 3 INCH Z-BARS

Distance between supports in feet	$\frac{1}{4}$ in.	$\frac{5}{16}$ in.	$\frac{3}{8}$ in.	$\frac{7}{16}$ in.	$\frac{1}{2}$ in.	$\frac{9}{16}$ in.
	6.7 lbs. per ft.	8.4 lbs. per ft.	9.7 lbs. per ft.	11.4 lbs. per ft.	12.5 lbs. per ft.	14.2 lbs. per ft.
2	10200	12700	13700	15900	16300	18300
3	6800	8470	9130	10600	10870	12200
4	5100	6350	6850	7950	8150	9150
5	4080	5080	5480	6360	6520	7320
6	3400	4230	4570	5300	5430	6100
7	2910	3630	3910	4540	4660	5230
8	2550	3180	3430	3980	4080	4580
9	2270	2820	3040	3530	3620	4070
10	2040	2540	2740	3180	3260	3660
11	1850	2310	2490	2890	2960	3330
12	1700	2120	2280	2650	2720	3050

STANDARD 4 INCH Z-BARS

Distance between supports in feet	$\frac{1}{4}$ in.	$\frac{5}{16}$ in.	$\frac{3}{8}$ in.	$\frac{7}{16}$ in.	$\frac{1}{2}$ in.	$\frac{9}{16}$ in.	$\frac{5}{8}$ in.	$1\frac{1}{16}$ in.	$\frac{3}{4}$ in.
	8.2 lbs. per ft.	10.3 lbs. per ft.	12.4 lbs. per ft.	13.8 lbs. per ft.	15.8 lbs. per ft.	17.9 lbs. per ft.	18.9 lbs. per ft.	20.9 lbs. per ft.	23.0 lbs. per ft.
2	16750	20850	24900	25750	29350	32950	32300	35500	38700
3	11170	13900	16600	17170	19570	21970	21530	23670	25800
4	8380	10430	12450	12880	14680	16480	16150	17750	19350
5	6700	8340	9960	10300	11740	13180	12920	14200	15480
6	5580	6950	8300	8580	9780	10980	10770	11830	12900
7	4790	5960	7110	7360	8390	9410	9230	10140	11060
8	4190	5210	6230	6440	7340	8240	8080	8880	9680
9	3720	4630	5530	5720	6520	7320	7180	7990	8600
10	3350	4170	4980	5150	5870	6590	6460	7100	7740
11	3050	3790	4530	4680	5340	5990	5870	6450	7040
12	2790	3480	4150	4290	4890	5490	5380	5920	6450
13	2580	3210	3830	3960	4520	5070	4970	5460	5950
14	2390	2980	3560	3680	4190	4710	4610	5070	5530

For safe loads below heavy lines the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous Tables — *Continued*SAFE LOADS IN POUNDS UNIFORMLY DISTRIBUTED
FOR Z - BARS

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of Z-bar.

STANDARD 5 INCH Z-BARS

Distance between supports in feet	$\frac{5}{16}$ in.	$\frac{3}{8}$ in.	$\frac{7}{16}$ in.	$\frac{1}{2}$ in.	$\frac{9}{16}$ in.	$\frac{5}{8}$ in.	$\frac{11}{16}$ in.	$\frac{3}{4}$ in.	$\frac{13}{16}$ in.
	11.6 lbs. per ft.	13.9 lbs. per ft.	16.4 lbs. per ft.	17.9 lbs. per ft.	20.2 lbs. per ft.	22.6 lbs. per ft.	23.7 lbs. per ft.	26.0 lbs. per ft.	28.3 lbs. per ft.
2	28500	34100	39700	40950	46000	51050	50500	55100	59750
3	19000	22730	26470	27300	30670	34030	33670	36730	39830
4	14250	17050	19850	20480	23000	25530	25250	27550	29880
5	11400	13640	15880	16380	18400	20420	20200	22040	23900
6	9500	11370	13230	13650	15330	17020	16830	18370	19920
7	8140	9740	11340	11700	13140	14590	14430	15740	17070
8	7130	8530	9930	10240	11500	12760	12630	13780	14940
9	6330	7580	8820	9100	10220	11340	11220	12240	13280
10	5700	6820	7940	8190	9200	10210	10100	11020	11950
11	5180	6200	7220	7450	8360	9280	9180	10020	10860
12	4750	5680	6620	6830	7670	8510	8420	9180	9960
13	4380	5250	6110	6300	7080	7850	7770	8480	9190
14	4070	4870	5670	5850	6570	7290	7210	7870	8540
15	3800	4550	5290	5460	6130	6810	6730	7350	7970
16	3560	4260	4960	5120	5750	6380	6310	6890	7470

STANDARD 6 INCH Z-BARS

Distance between supports in feet	$\frac{3}{8}$ in.	$\frac{7}{16}$ in.	$\frac{1}{2}$ in.	$\frac{9}{16}$ in.	$\frac{5}{8}$ in.	$\frac{11}{16}$ in.	$\frac{3}{4}$ in.	$\frac{13}{16}$ in.	$\frac{7}{8}$ in.
	15.6 lbs. per ft.	18.3 lbs. per ft.	21.0 lbs. per ft.	22.7 lbs. per ft.	25.4 lbs. per ft.	28.1 lbs. per ft.	29.3 lbs. per ft.	31.9 lbs. per ft.	34.6 lbs. per ft.
2	45000	52450	59850	61600	68400	75200	74900	81150	87450
3	30000	34970	39900	41070	45600	50130	49930	54100	58300
4	22500	26230	29930	30800	34200	37600	37450	40580	43730
5	18000	20980	23940	24640	27360	30080	29960	32460	34980
6	15000	17480	19950	20530	22800	25070	24970	27050	29150
7	12860	14990	17100	17600	19540	21490	21400	23190	24990
8	11250	13110	14960	15400	17100	18800	18730	20290	21860
9	10000	11660	13300	13690	15200	16710	16640	18030	19430
10	9000	10490	11970	12320	13680	15040	14980	16230	17490
11	8180	9540	10880	11200	12440	13670	13620	14750	15900
12	7500	8740	9980	10270	11400	12530	12480	13530	14580
13	6920	8070	9210	9480	10520	11570	11520	12480	13450
14	6430	7490	8550	8800	9770	10740	10700	11590	12490
15	6000	6990	7980	8210	9120	10030	9990	10820	11660
16	5630	6560	7480	7700	8550	9400	9360	10140	10930
17	5290	6170	7040	7250	8050	8850	8810	9550	10290
18	5000	5830	6650	6840	7600	8360	8320	9020	9720

For safe loads below heavy lines the deflections will be greater than the allowable limit for plastered ceilings = $\frac{1}{360}$ span.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Columns

STEEL, CAST IRON AND PIPE

Steel columns are made in a variety of forms. A single I-beam section may be used or a combination of several standard sections.

Illustrations 45 to 57 inclusive, page 44, show a few of the types of built column sections in general use, and the table below explains how they are made up.



No. 45



No. 46



No. 47



No. 48



No. 49



No. 50



No. 51



No. 52



No. 53



No. 54



No. 55



No. 56



No. 57

No. 45—Two Tee sections.

No. 46—Four angle sections.

No. 47—I-beam and two plates.

No. 48—Four angles and three plates.

No. 49—Two channels and one I-beam.

No. 50—Two channels and one I-beam.

No. 51—Three I-beams.

No. 52—Two channels, two reinforcing or stiffener plates, two cover plates.

No. 53—Two channels with lattice bars.

No. 54—Two plates, four angles, two cover plates.

No. 55—Two plates, four angles, lattice bars.

No. 56—Two channels and lattice bars.

No. 57—Four angles and lattice bars.

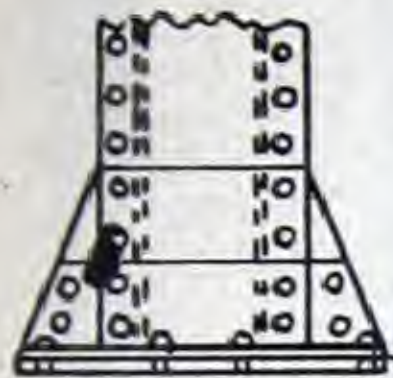
The different members in all of the above combinations are riveted together. Steel columns are usually made long enough to extend two storeys in height in one section, the different sections being spliced with steel plates above the floor line. Beams and girders are connected or framed to steel columns with angles used as brackets and are either bolted or riveted.

Base plates for steel columns are made up of steel plates and angles, riveted together and to the column section.

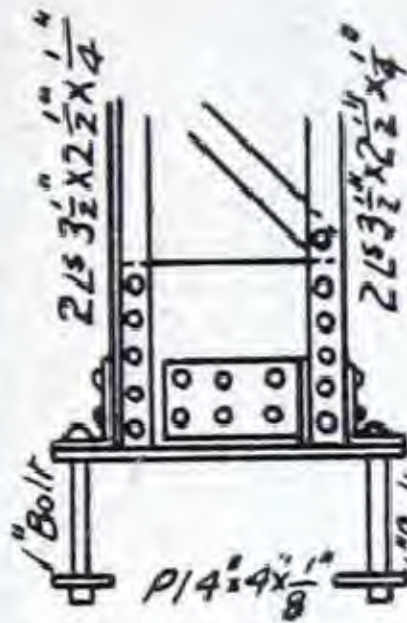
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Columns—Continued

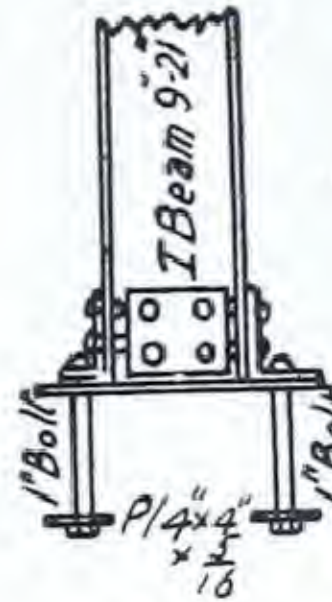
Illustrations Nos. 58, 59 and 60, page 45, show these bases for three typical built column sections.



No. 58



No. 59



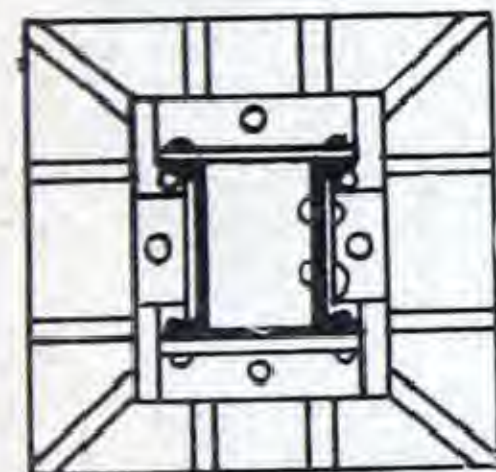
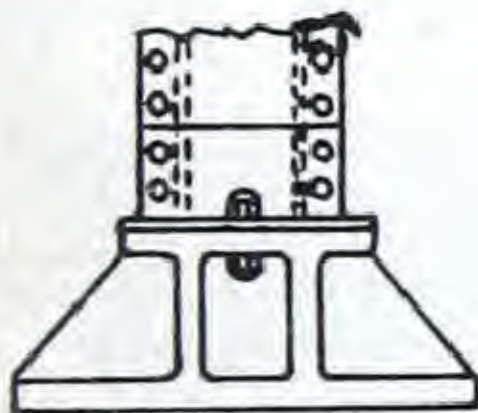
No. 60

No. 58 shows a base for the column illustrated by No. 52, page 44, No. 59 for column shown by No. 48 and No. 60, a steel base for a column made of a single I section.

With some of the larger columns a heavy cast iron separate base or stool is required, shown by No. 61, page 45.

Bases of any kind for steel columns must be specially designed after all the conditions of loading and bearing power of footings are known. There are no bases of standard size.

Cast Iron Columns are generally used in ordinary building construction and may be either round, square, rectangular or H shaped, (see No. 62, page 45), although other special shapes are sometimes adopted. The chief advantage of an H column is that all surfaces are open to inspection. The cost is a little higher than for either round or square columns however. Cast iron columns may be either plain or ornamental. Tables giving the safe bearing values and the weights of the three types of columns mentioned will be found on pages 52—56.



No. 61—Built column section on cast iron base.

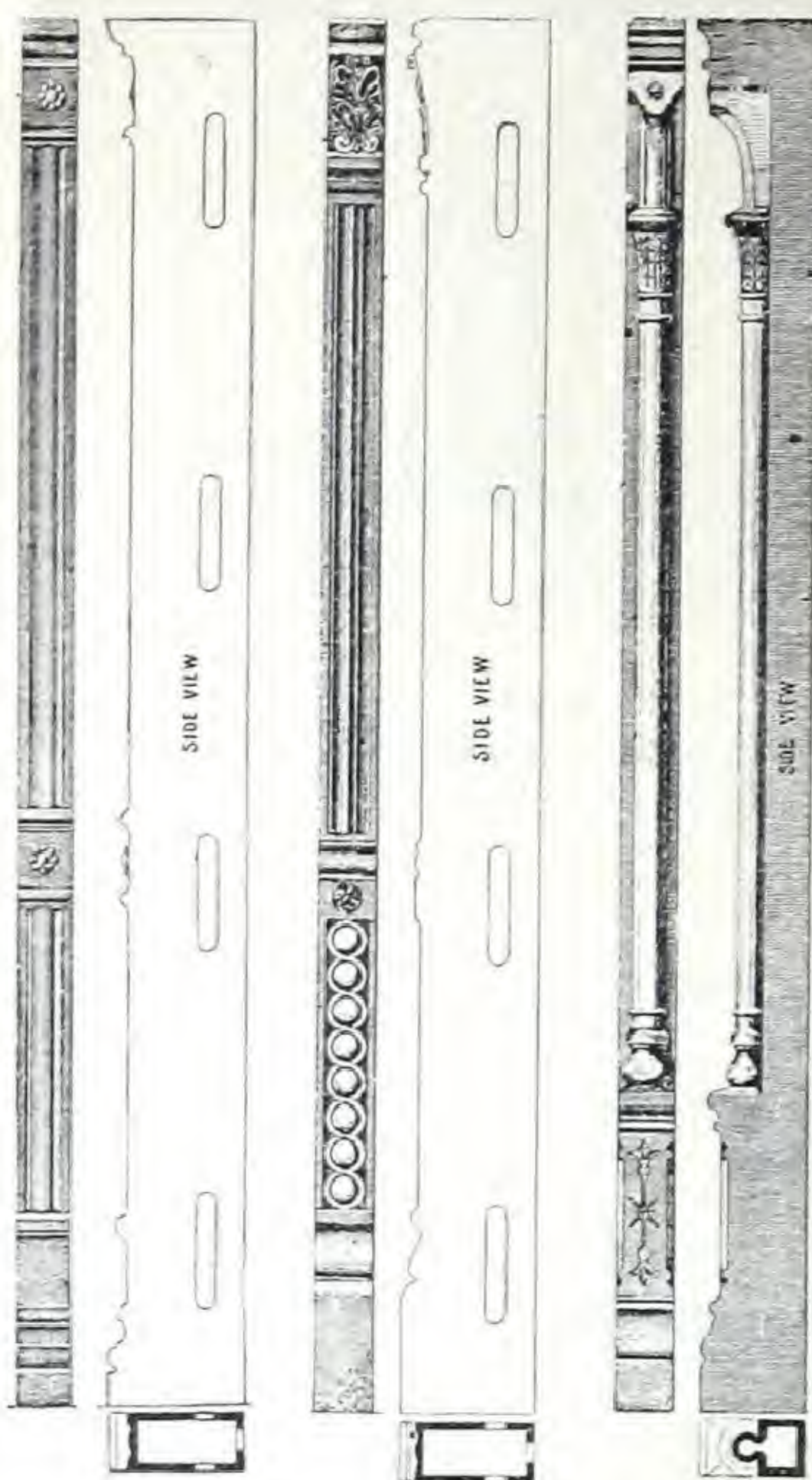


No. 62—Cast iron H-Column.

Ornamental columns, both square, rectangular and round are made up in a great variety of designs. Illustrations 63, 64, 65, 66, 67, and 68, page 46, show some of them.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

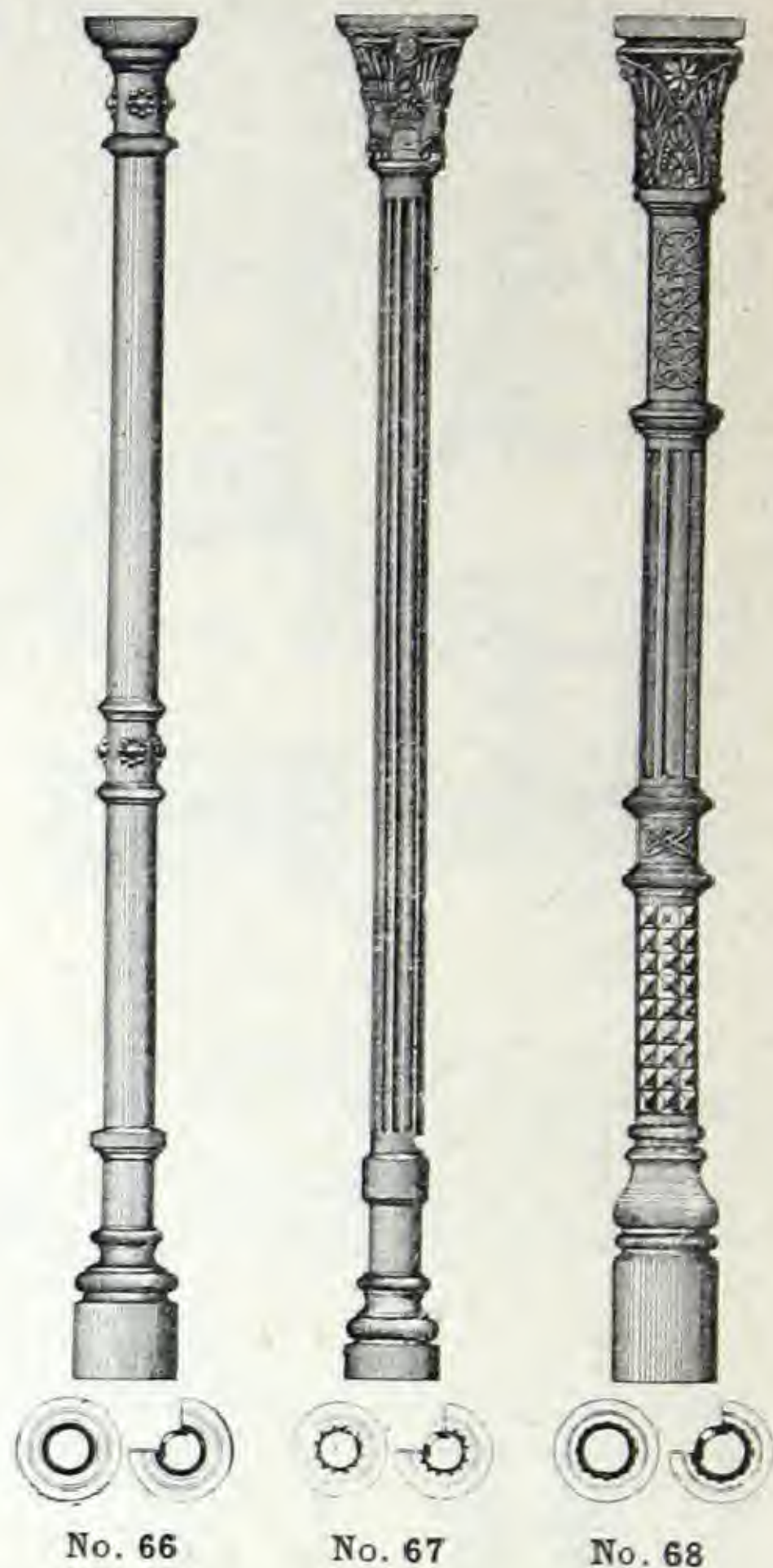
Columns — *Continued*
 RECTANGULAR AND CIRCULAR ORNAMENTAL
 CAST IRON COLUMNS



No. 63

No. 64

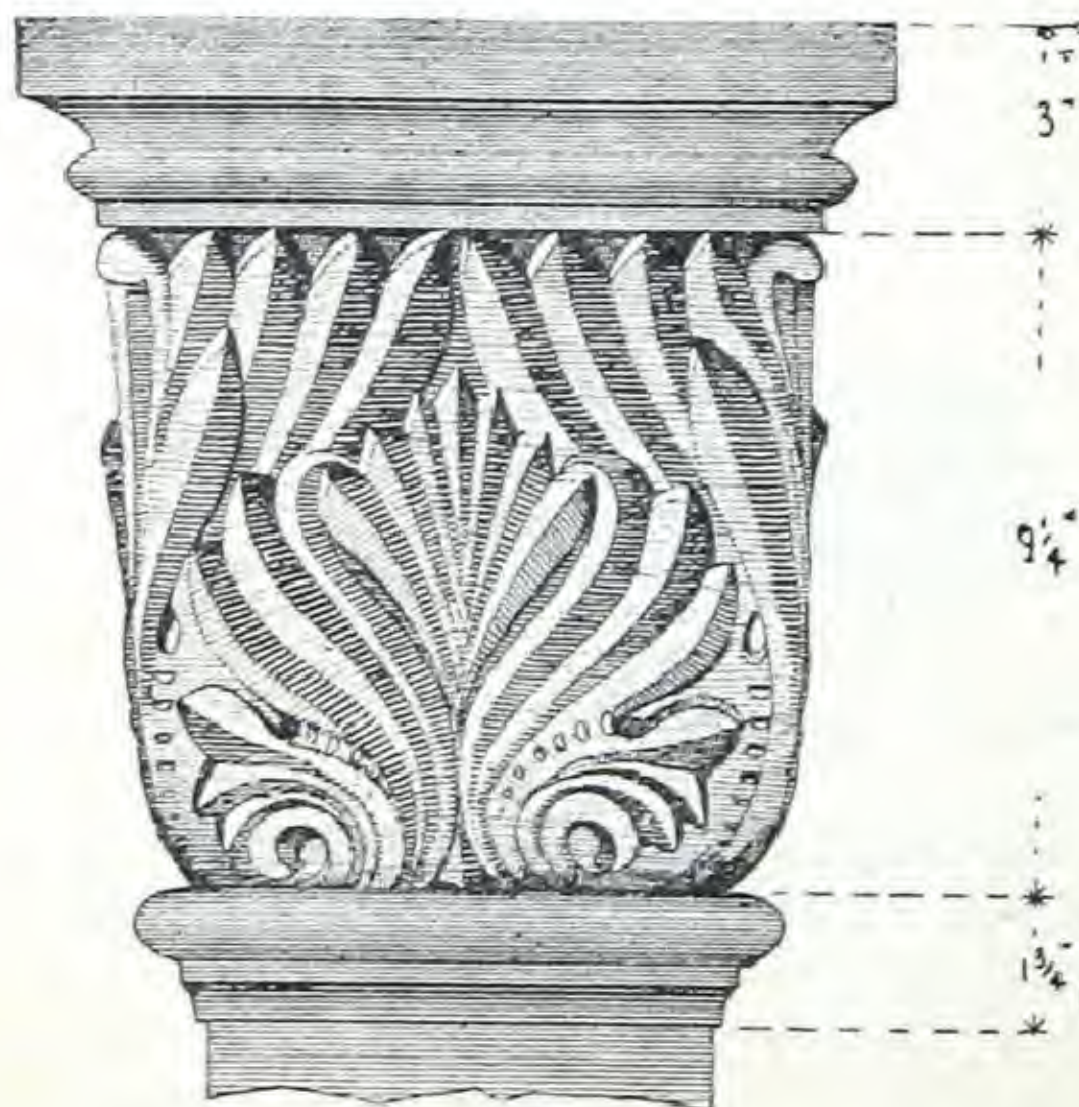
No. 65



No. 66

No. 67

No. 68



No. 69



No. 70

PRESSED ORNAMENTAL CAPS

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Columns — *Continued*

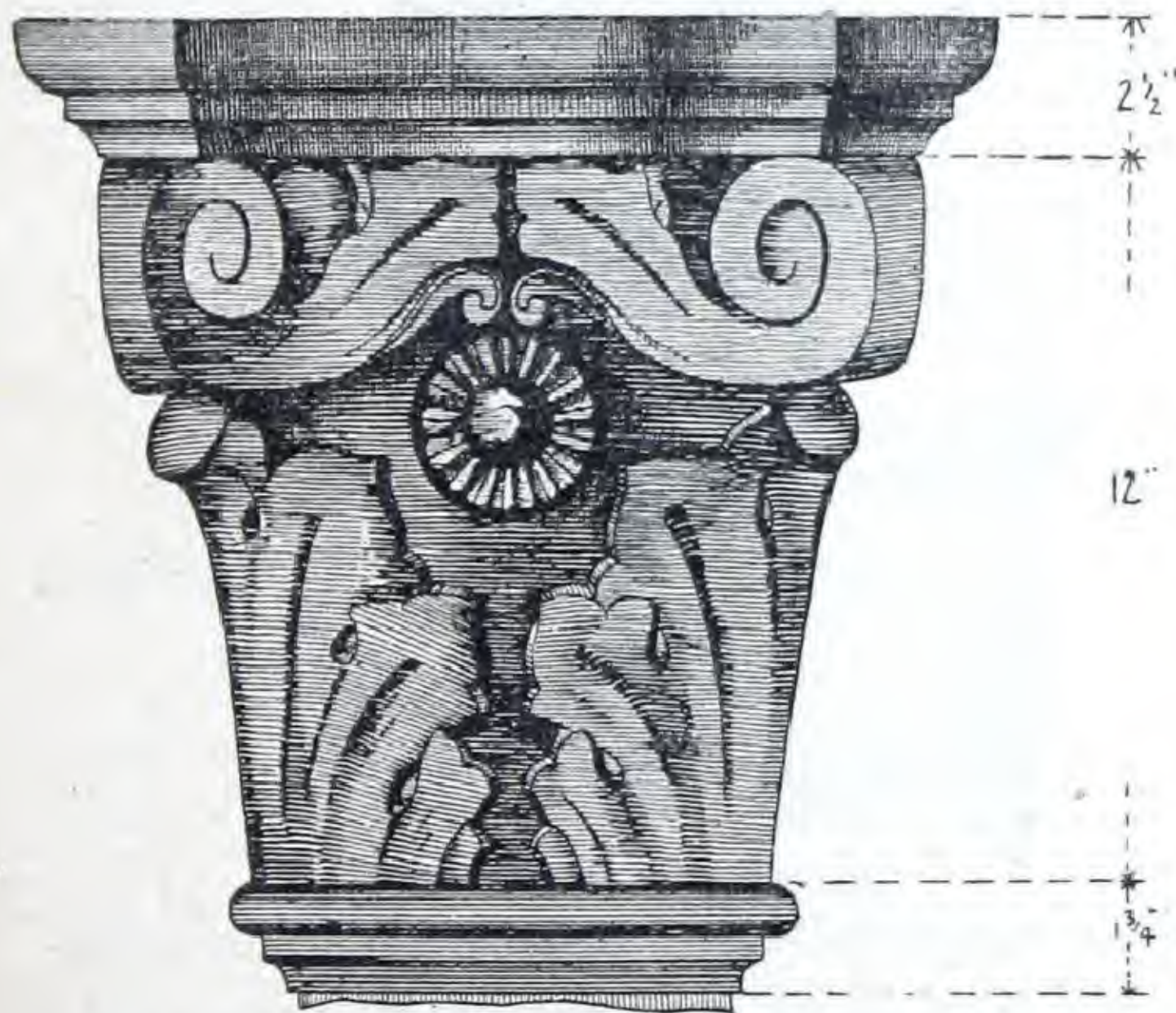
PRESSED ORNAMENTAL CAPS



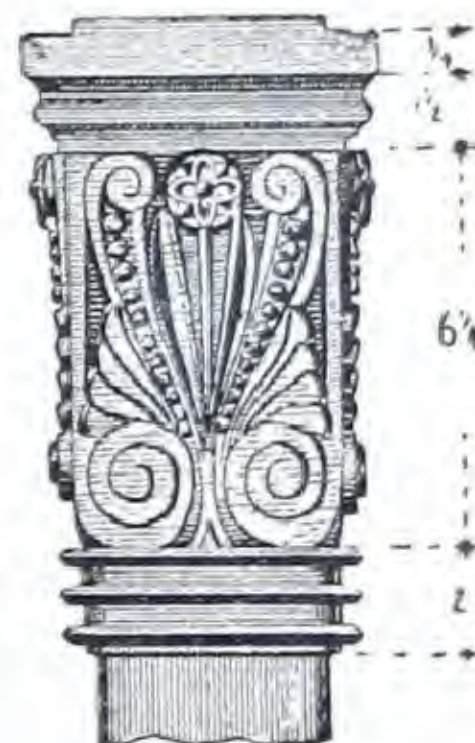
No. 71



No. 72



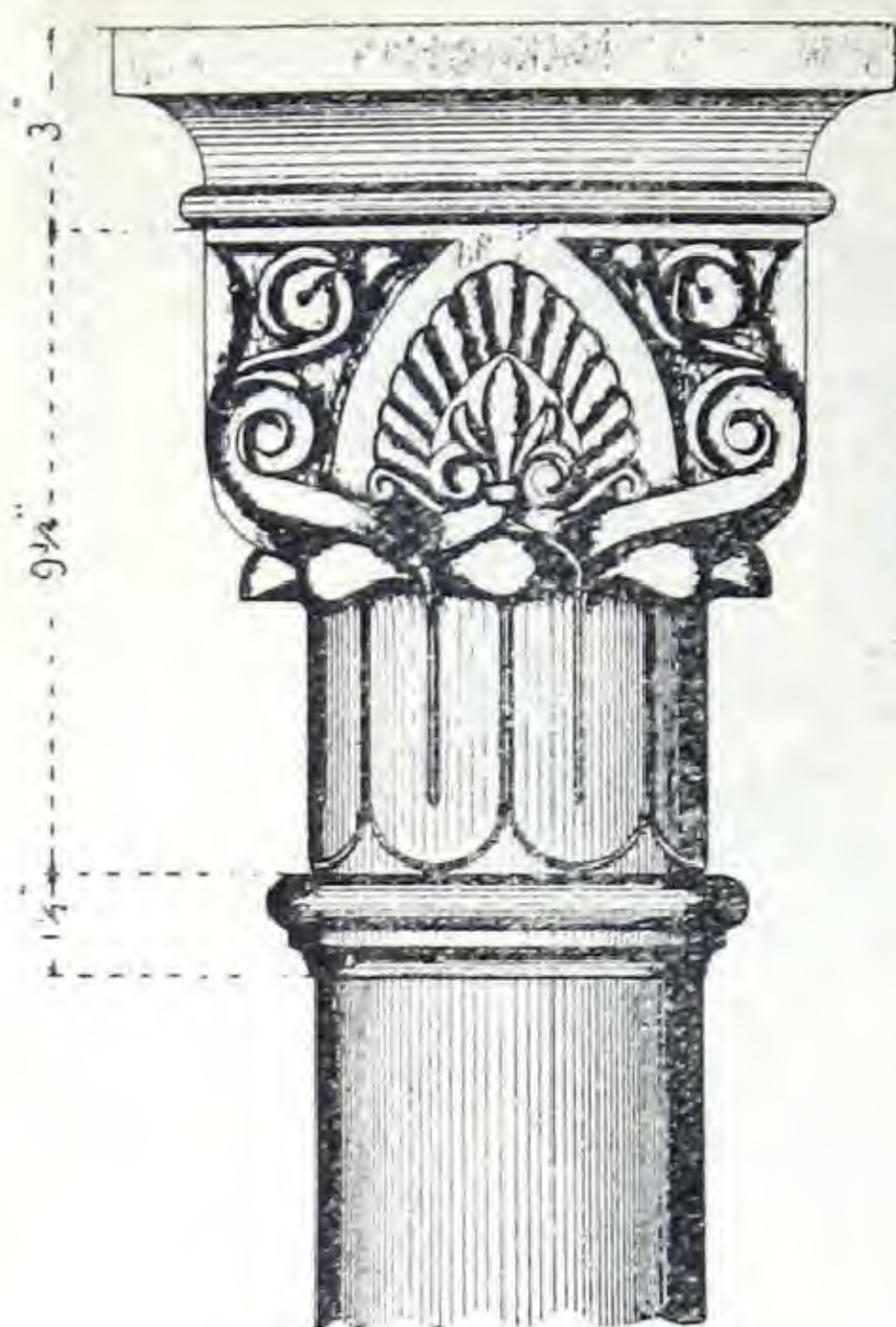
No. 73



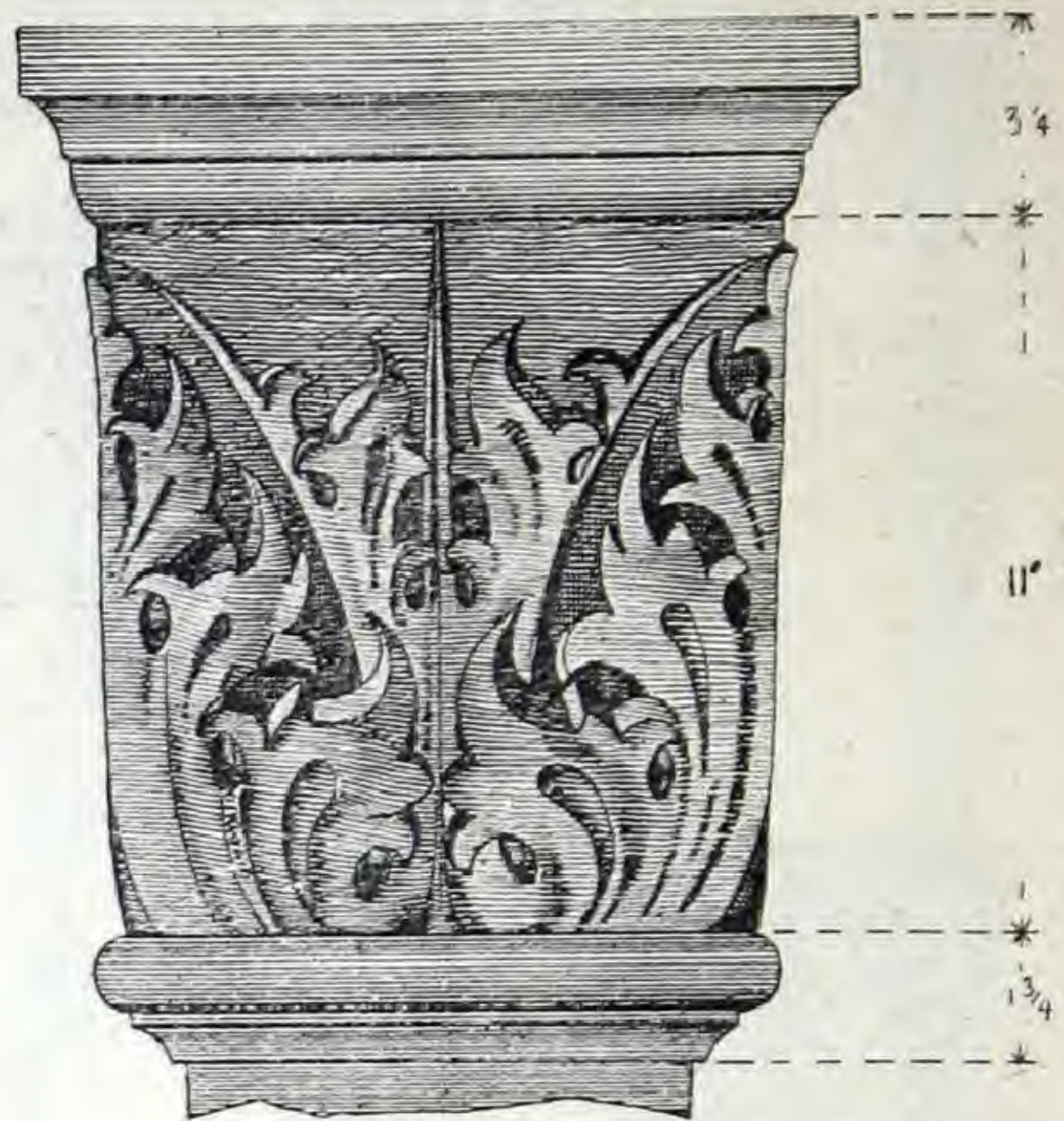
No. 74

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

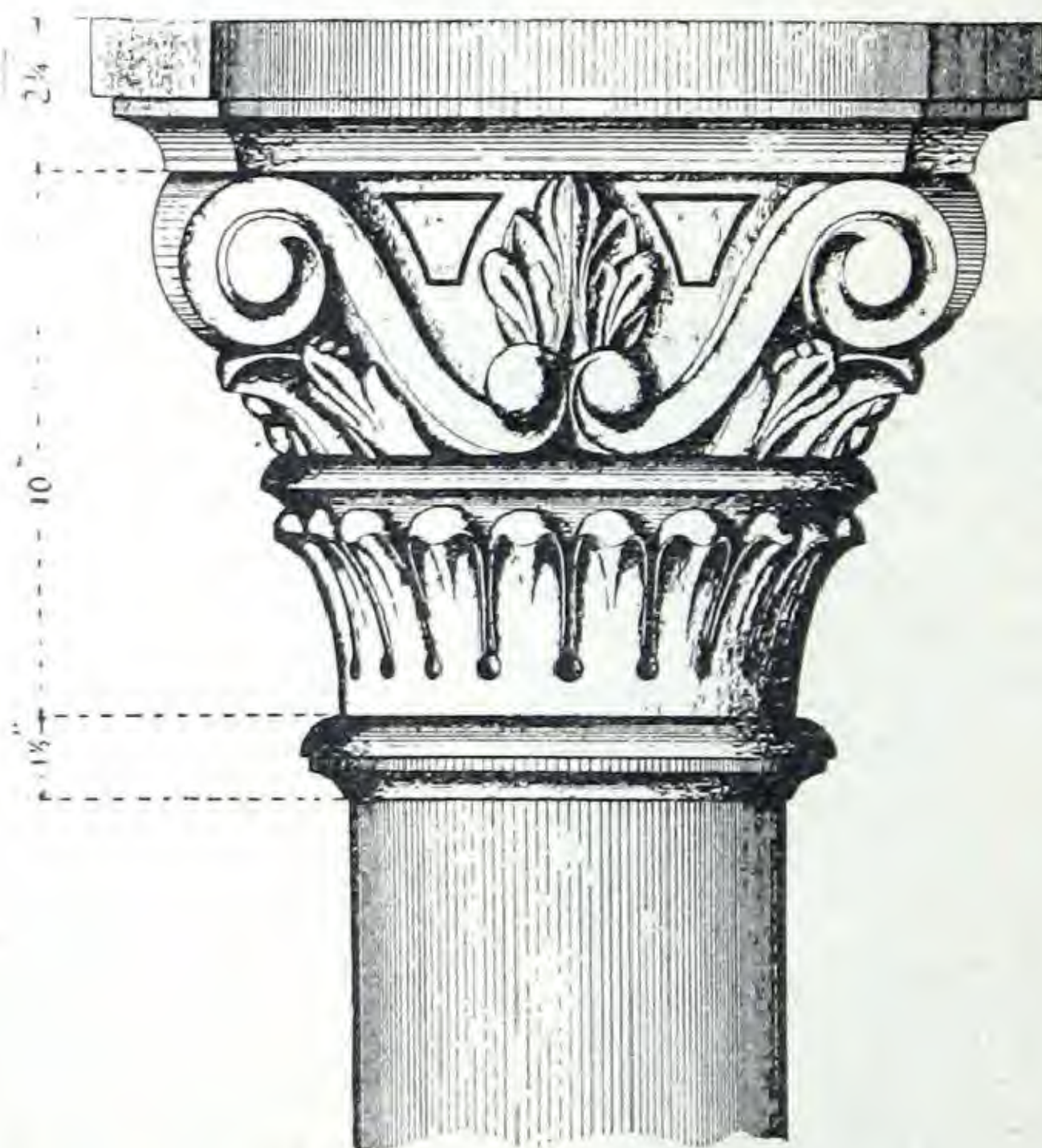
Columns — *Continued*
PRESSED ORNAMENTAL CAPS



No. 75



No. 76



No. 77

Columns can be made three-quarter round when used as corner columns.

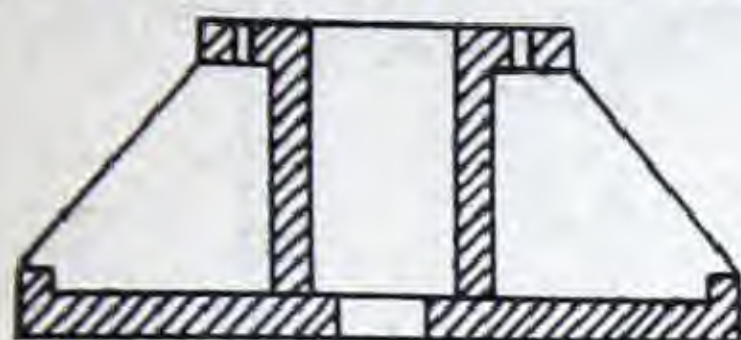
Pressed Ornamental Caps and Bases for cast iron columns are made in a great variety of designs. Some of these are shown by illustrations 69 to 77, pages 46, 47, 48.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

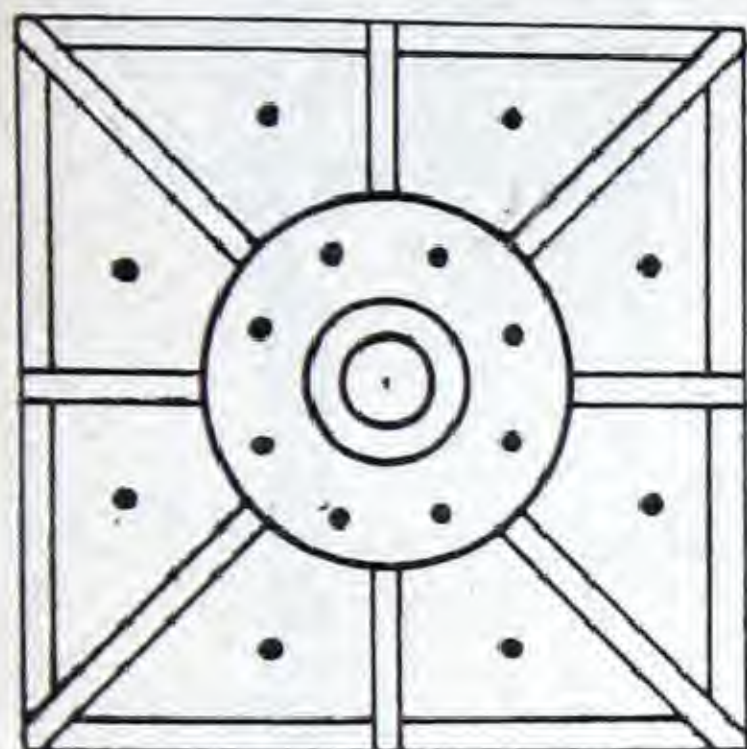
Columns—Continued

STOOLS OR BASES

When heavy loads are supported by columns, separate bases or stools should be placed on the footings. See illustrations 78 and 79, page 49.

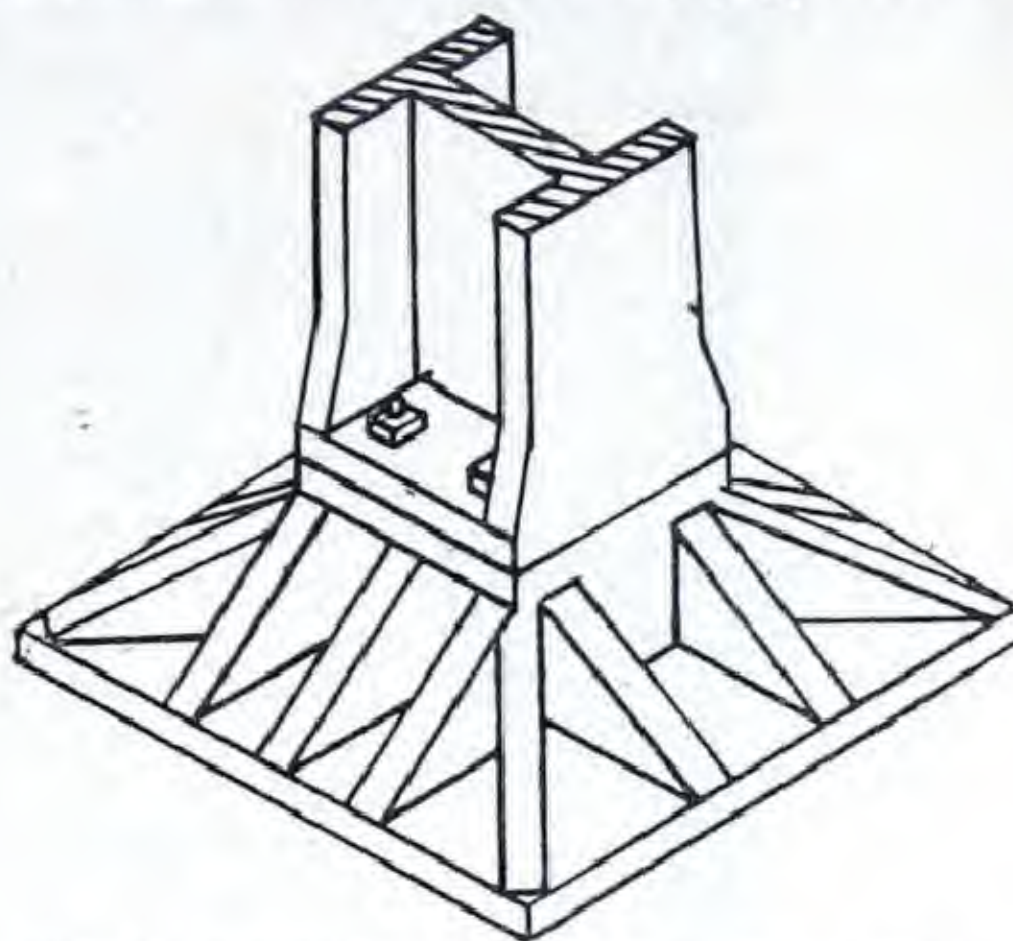


SECTION OF STOOL



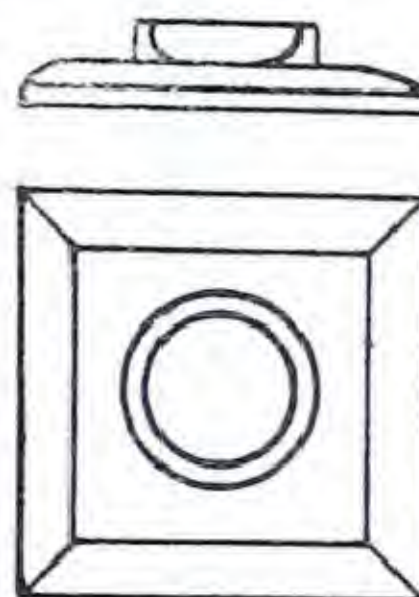
PLAN OF STOOL

No. 78—Typical cast iron Stool or Base for heavy Column.



No. 79—H-Column on separate cast iron Base

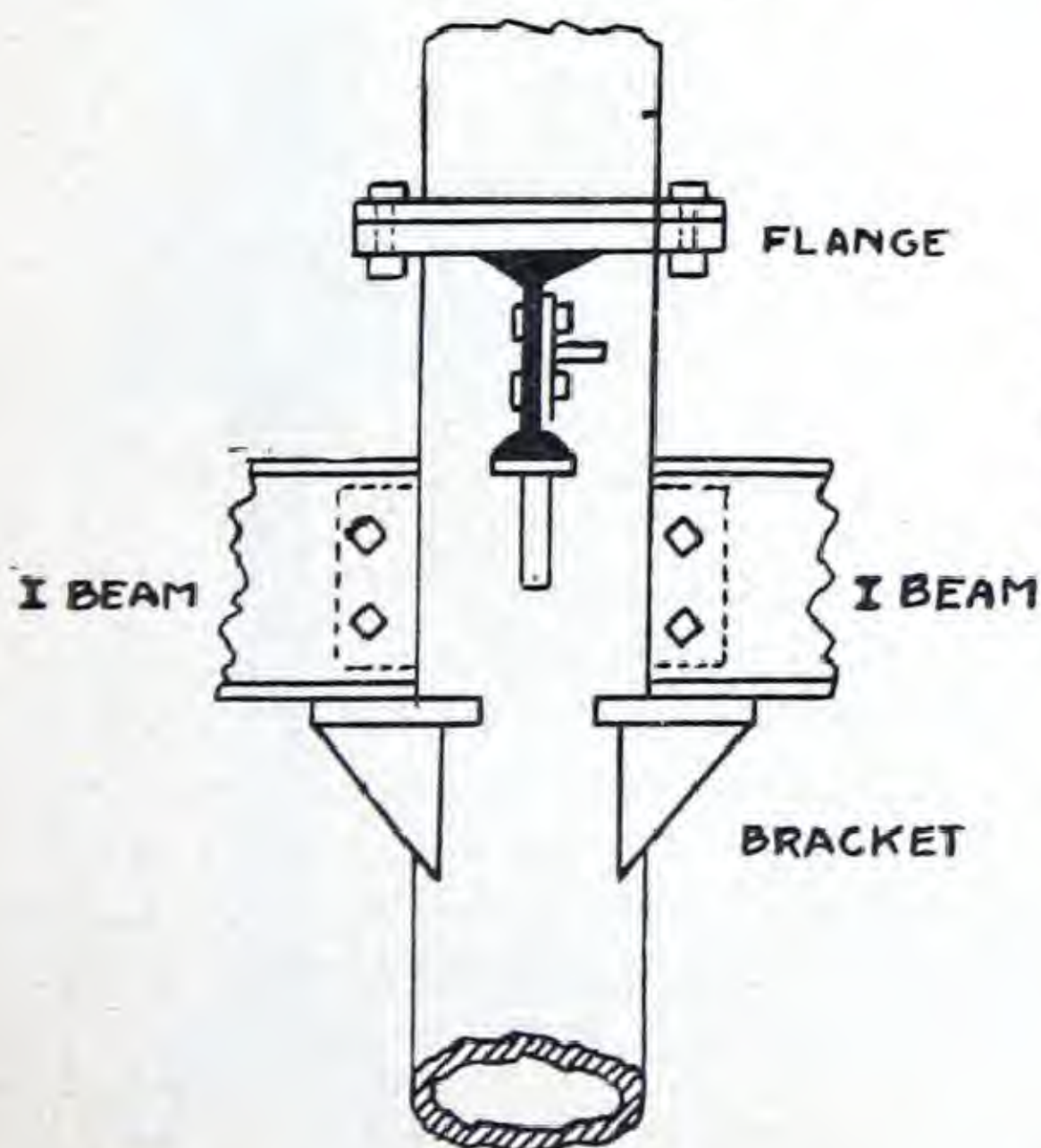
When the loads are not great, smaller bases are used. See No. 80.



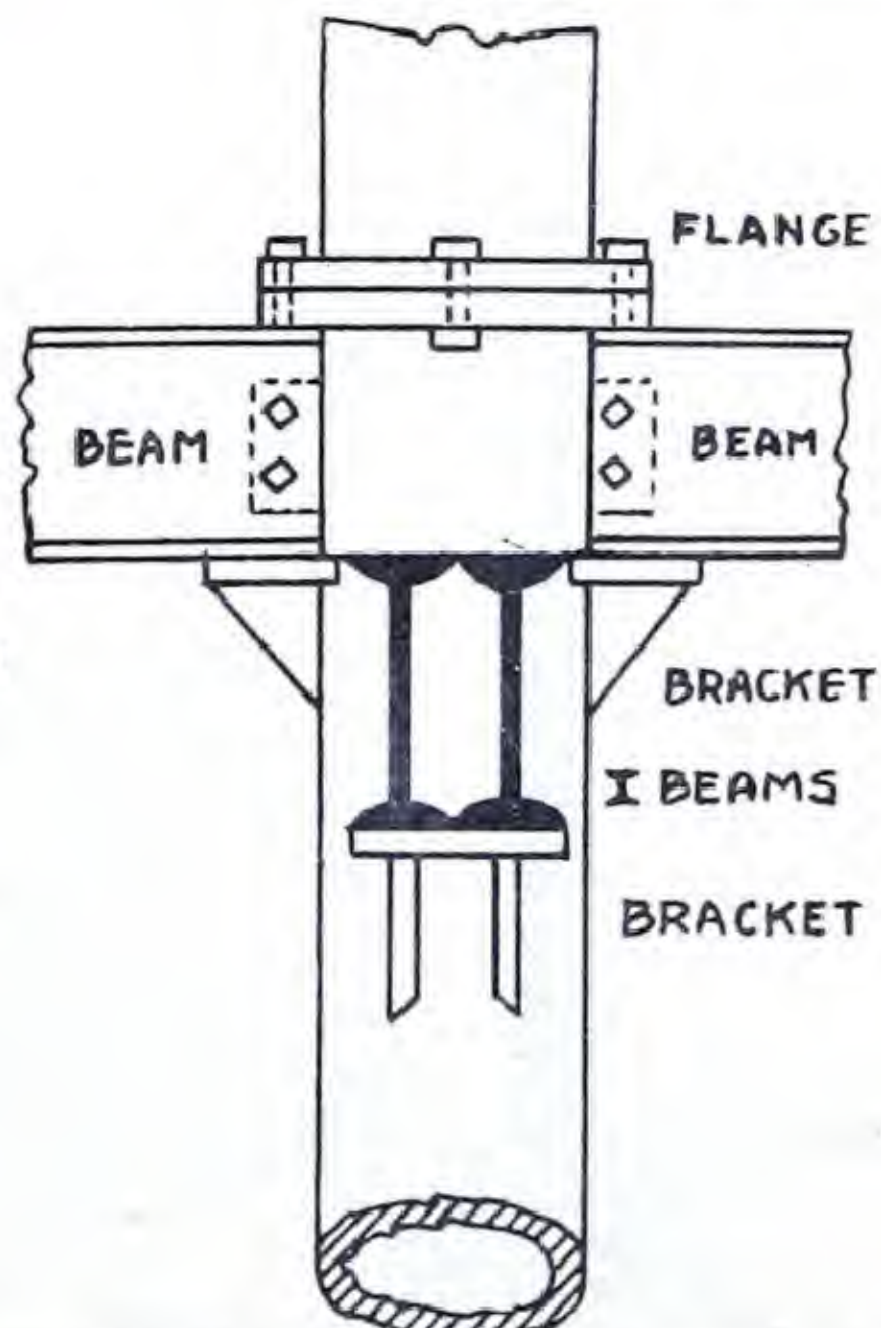
No. 80—Loose cast iron Cap or Base.

Any of these bases may be used with square or round columns or H-columns as shown by Nos. 62 and 79.

FRAMING



No. 81—Framing of I-beams to cast iron Column, also connecting two circular Columns together.



No. 82—Framing of I-beams to cast iron Columns, showing brackets.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Columns — *Continued*

FRAMING

The round column for which the base shown by No. 80 is designed, fits over the part projecting upward. This base may also be used as a cap.

Steel beams are connected to cast iron columns by means of flanges and brackets which are cast solid with the column. See illustrations 81 and 82, page 49.



No. 83—Typical framing, wooden Beams and Joist.

Columns are connected together, one above the other, by bolted flanges, as shown by Nos. 81 and 82.

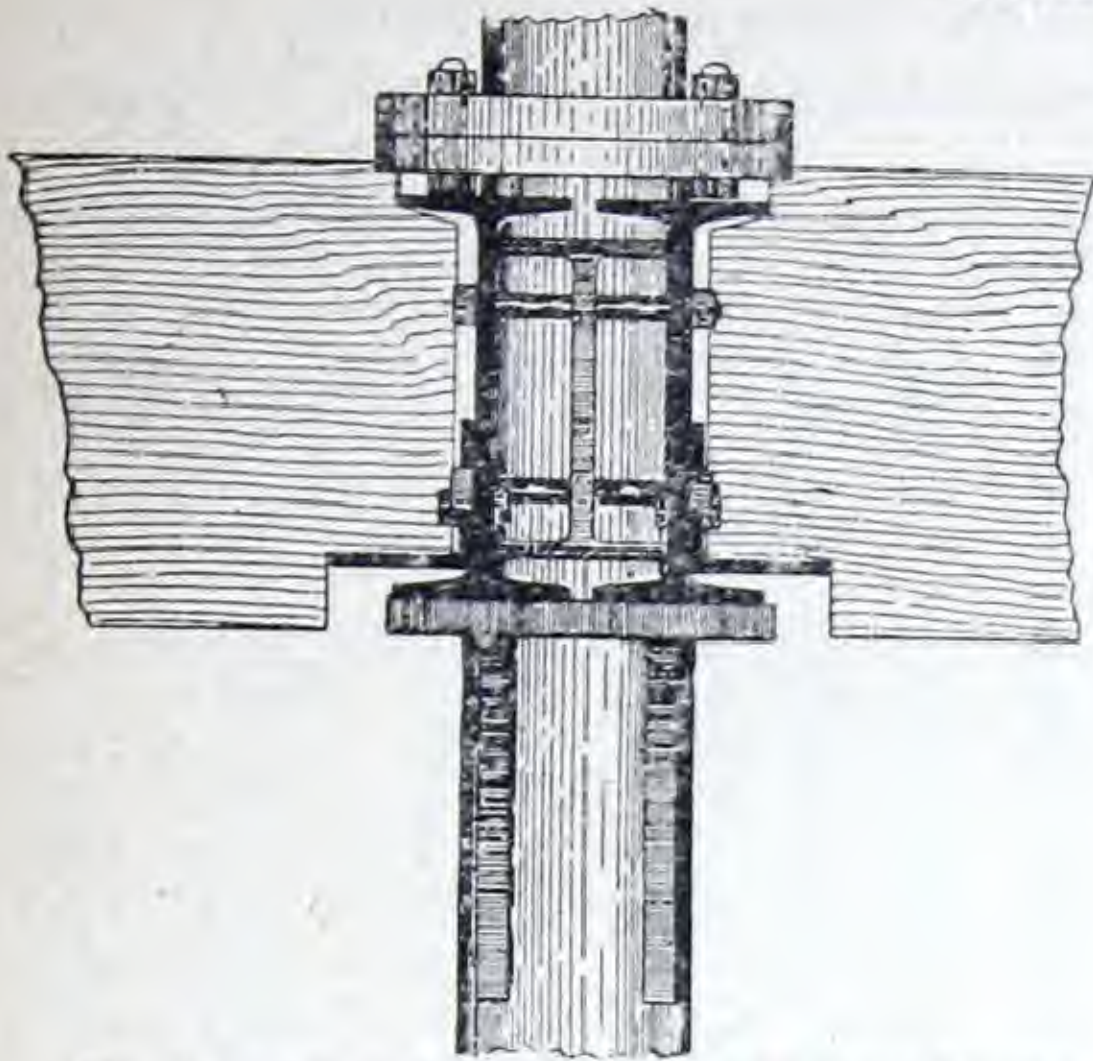
Various methods of framing steel beams and wooden joists to cast iron columns are shown by illustrations Nos. 81, 82, 83, 84, 85, 86 and 87.



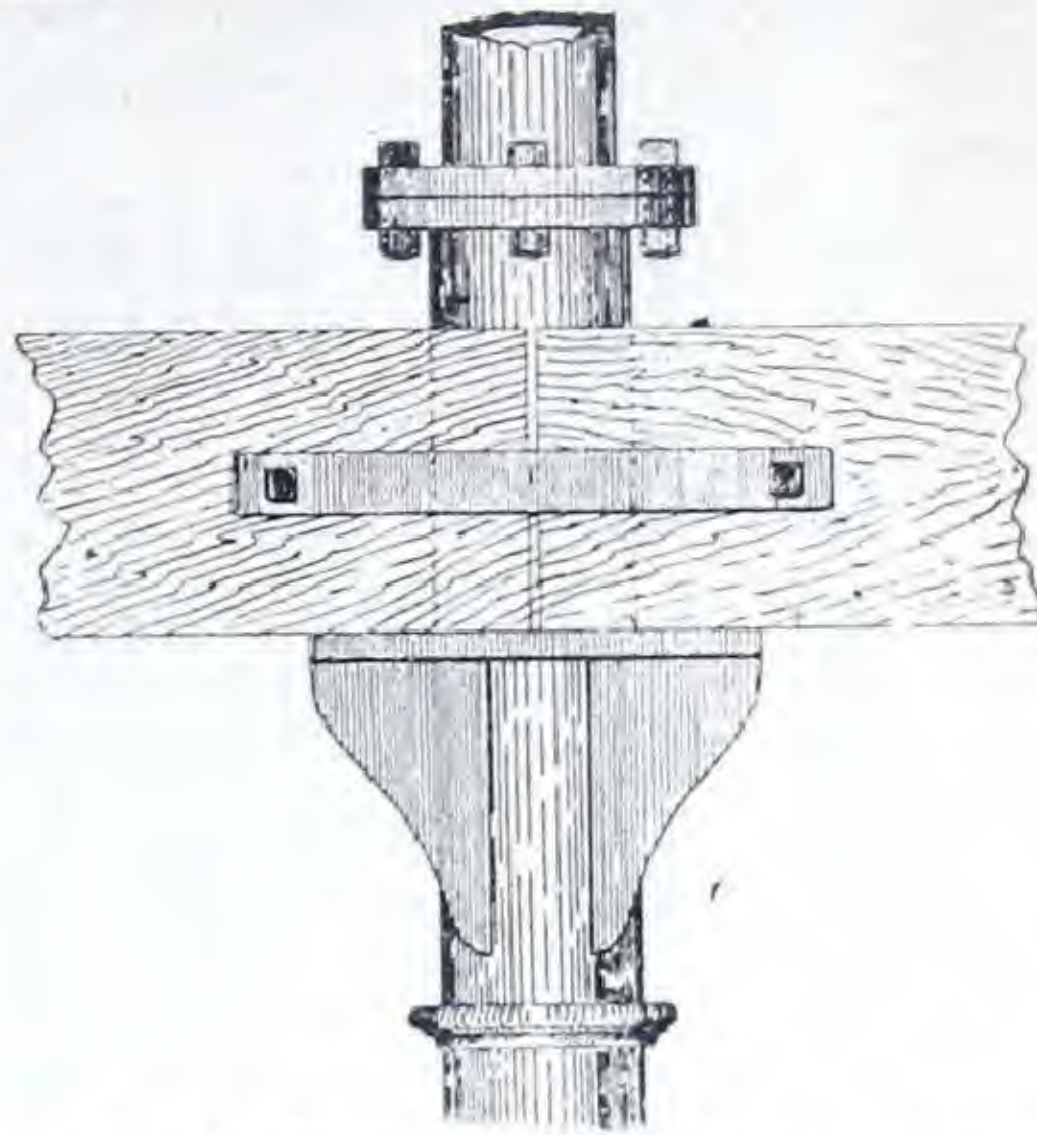
No. 84—Typical framing, steel Beams, wooden Joists, also shows separate Stool, or base at foot of column.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

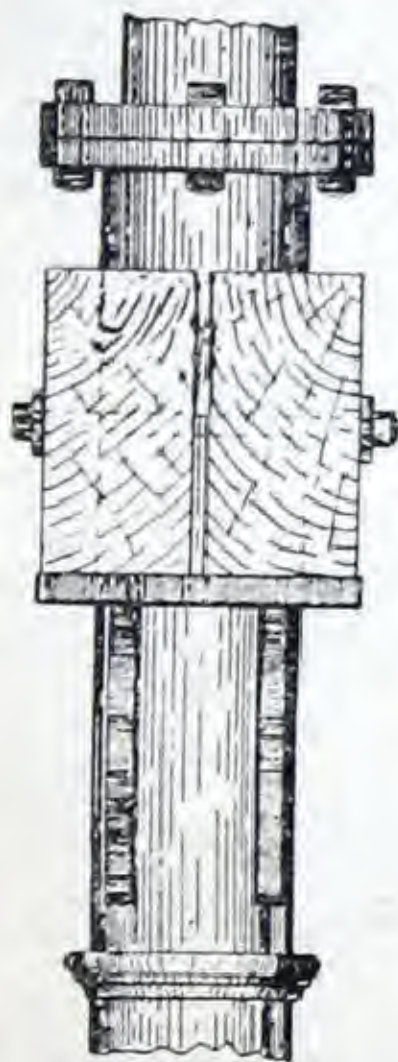
Columns — *Continued* FRAMING



No. 85—Typical column framing, steel Beams, timber Joists supported on shelf angles.



No. 86—Typical column framing, side view of No. 87.



No. 87—Typical column framing, timber Beams, carried on brackets

When columns less than five inches in diameter are required, wrought iron pipe is used, because of the difficulty in casting such a small column. Cast iron caps and bases are used with these pipe columns, similar to that shown by No. 80, page 49. Pipe columns can be made ornamental by slipping on cast iron sections as shown by No. 88, page 51. This is usually done, especially when the columns are to be used in the fronts of buildings.

When plain round cast iron columns are ordered, separate caps and bases will be furnished unless otherwise specified.

Following are tables showing safe bearing strength and weight per foot of pipe columns, also round, square and H shaped cast iron columns. The sizes and weights of caps and bases must be figured out for each different size of column as there are no standard sizes. For arriving at an approximate weight, however, it is usual to add three feet to the overall length of the column. This additional weight will cover the cap, base and side brackets.



No. 88—Pipe Columns, ornamental ends, of cast iron slipped over pipe.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Gas or Steam Pipe Columns

Following is a table showing the safe load in tons for pipe columns.

Nominal Size	External Diameter	Thickness	Weight per Foot	Area of Section	Radius of Gyration	Length in Feet				
						8	9	10	12	14
In.	In.	In.	Lbs.			Safe bearing load in tons				
Standard pipe	2½	2.875	.204	5.74	1.59	.94	5.90	5.51	5.21	.....
	3	3.5	.217	7.54	2.26	1.16	9.14	8.75	8.35	7.52
	3½	4.0	.226	9.00	2.59	1.35	11.02	10.66	10.25	9.39
	4	4.5	.237	10.66	3.33	1.50	14.45	14.11	13.65	12.72
	4½	5.0	.247	12.34	3.73	1.68	16.78	16.33	15.88	14.90
	5	5.563	.259	14.50	4.17	1.88	18.76	18.76	18.26	17.31
	6	6.625	.280	18.76	5.57	2.25	25.06	25.06	25.06	24.39
	7	7.625	.301	23.37	7.18	2.59	32.31	32.31	32.31	32.31
X X Strong	8	8.625	.322	28.18	8.14	2.94	36.63	36.63	36.63	36.63
	2½	2.875	.56	13.68	4.09	0.82	14.10	13.04	11.86	.....
	3	3.5	.608	18.56	5.52	1.02	21.25	20.12	19.04	16.56
	3½	4.0	.642	22.75	6.63	1.20	27.18	26.02	24.86	22.54
	4	4.5	.682	27.48	8.33	1.35	35.31	34.15	32.84	30.19
	5	5.563	.75	38.12	11.73	1.70	52.78	51.37	49.94	47.06
	6	6.625	.875	53.11	15.80	2.04	71.10	71.10	70.58	66.99

WEIGHT PER LINEAL FOOT OF CIRCULAR CAST IRON COLUMNS

Outside Diameter in Inches	THICKNESS OF METAL IN INCHES															
	½	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3½	4	4½	5	5½
3	12.3	14.6	16.6	18.3	19.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	17.2	21.0	24.0	27.0	29.5	32.1	33.8	35.4	.....	.....	.....	.....	.....	.....	.....	.....
5	22.1	27.0	31.3	35.5	39.3	43.0	46.0	49.0	51.54	54.1	55.84	57.5	.....	.....	.....	.....
6	27.0	33.0	39.0	44.0	49.1	54.1	58.3	62.4	66.30	69.9	73.02	76.0	78.6	80.84	82.83	.....
7	32.0	39.1	46.0	53.0	59.0	65.1	70.6	76.1	81.00	85.6	90.20	94.3	98.2	101.70	105.00	107.84
8	36.8	45.3	53.4	61.2	69.1	76.1	83.1	89.5	95.80	101.8	107.40	112.8	117.8	122.60	127.00	131.20
9	41.7	51.4	61.1	70.0	78.6	87.1	95.1	103.1	110.50	117.7	124.60	131.2	137.5	143.40	149.10	154.50
10	46.6	57.5	75.5	87.1	88.4	98.0	107.4	116.4	125.20	133.7	142.00	149.6	157.1	164.30	171.20	177.80
11	51.6	64.0	83.0	96.1	98.2	109.1	120.1	130.1	140.00	149.6	159.00	168.0	176.8	185.20	193.30	201.10
12	56.5	70.0	90.0	104.2	108.0	120.0	132.1	143.5	154.70	165.6	176.00	186.4	196.4	206.00	215.40	224.40
13	61.4	76.0	98.1	113.1	118.1	131.2	144.2	157.1	169.40	181.5	193.30	204.8	216.0	226.90	237.50	247.70
14	66.3	82.1	105.1	121.4	128.1	142.0	156.5	170.4	184.10	197.4	210.50	223.2	235.7	247.70	259.60	271.10
15	71.2	88.2	112.3	130.1	137.5	153.3	169.4	184.1	198.90	213.4	227.70	241.6	255.3	268.20	281.70	294.40
16	76.1	94.4	119.7	138.6	147.3	164.3	181.0	197.4	213.50	229.4	244.90	260.0	274.9	289.50	303.70	317.70
17	81.0	100.5	120.1	139.1	157.1	175.4	193.3	211.0	228.30	245.3	262.00	278.4	294.5	310.30	325.80	341.00
18	86.0	107.0	127.0	147.0	167.0	186.4	206.0	244.4	243.00	261.3	279.20	296.8	314.2	331.20	348.00	364.30
19	91.0	113.0	134.4	156.0	177.1	197.5	218.1	238.0	257.70	277.2	296.40	315.2	338.8	352.10	370.00	387.70
20	96.0	119.0	142.1	164.3	186.6	208.8	230.1	251.5	272.50	293.2	313.60	333.6	353.4	372.90	392.10	411.00
21	100.6	125.0	149.1	173.1	196.6	219.6	242.4	265.0	287.20	309.0	330.80	352.1	373.1	393.80	414.20	434.30
22	105.6	131.2	156.5	181.5	206.2	230.6	255.0	278.0	302.00	325.1	348.00	370.5	393.0	414.60	436.30	457.60
23	110.5	137.3	164.1	190.1	216.1	242.0	267.0	292.0	316.70	341.0	365.10	388.9	412.3	435.50	458.40	481.00
24	115.4	143.5	171.2	199.0	226.0	253.0	279.2	305.4	331.40	357.0	382.30	407.3	432.0	456.40	480.50	504.20

NOTE.— The table is arranged for the weight of plain shaft for brackets, flanges, etc., calculate the cubical contents in inches and multiply by .263

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN TONS OF 2,000 POUNDS FOR HOLLOW ROUND CAST IRON COLUMNS WITH SQUARE ENDS

Diameter in inches	Thickness in inches	LENGTH OF COLUMN IN FEET										Area of me- tal in inches	Weight per foot of length
		6	8	10	12	14	16	18	20	22	24		
5	$\frac{3}{8}$	39	34	29	24	.....	.....	.....	.....	.....	.....	10.0	31.3
	$\frac{1}{2}$	45	38	32	27	.....	.....	.....	.....	.....	.....	11.3	35.3
5½	$\frac{3}{4}$	46	40	35	30	26	.....	.....	.....	.....	.....	11.2	35.0
	1	52	46	40	34	29	.....	.....	.....	.....	.....	12.7	39.7
6	$\frac{3}{8}$	52	47	41	36	31	27	24	.....	.....	.....	12.4	38.7
	$\frac{1}{2}$	60	53	47	41	36	31	27	.....	.....	.....	14.1	44.0
	1	66	59	52	45	39	34	30	.....	.....	.....	15.7	49.0
7	$\frac{3}{8}$	65	60	54	48	43	38	34	.....	.....	.....	14.7	46.0
	$\frac{1}{2}$	74	68	62	55	49	43	38	.....	.....	.....	16.8	52.6
	1	83	76	68	61	54	48	43	.....	.....	.....	18.8	58.9
8	$\frac{3}{8}$	78	72	67	61	55	50	45	40	36	33	17.1	53.4
	$\frac{1}{2}$	89	83	76	70	63	57	51	46	41	37	19.6	61.2
	1	100	93	86	79	71	64	58	52	47	42	22.0	68.7
9	$\frac{7}{8}$	103	98	91	85	80	71	65	59	54	49	22.3	69.8
	1	117	110	103	95	90	80	73	67	61	55	25.1	78.5
	1½	129	122	114	105	99	89	81	74	67	61	27.8	87.0
10	$\frac{7}{8}$	118	112	106	100	93	86	79	73	67	62	25.1	78.4
	1	133	127	120	112	105	97	89	82	76	69	28.3	88.4
	1½	147	141	133	125	116	107	99	91	84	77	31.4	98.0
	1¾	161	154	146	136	127	118	109	100	92	84	34.4	107.4
11	1	149	143	137	129	122	114	106	98	91	85	31.4	98.2
	1½	165	159	152	144	135	126	118	109	101	94	34.9	109.1
	1¾	182	175	167	158	148	139	129	120	111	103	38.3	119.7
	1½	197	190	181	171	161	151	140	130	121	112	41.6	129.9
12	1½	184	178	171	163	154	146	137	128	120	112	38.4	120.1
	1¾	202	195	188	179	170	160	150	141	132	123	42.2	131.9
	1½	220	212	204	194	184	174	163	153	143	133	45.9	143.4
	1½	237	229	220	210	199	187	176	165	154	144	49.5	154.6
13	1½	202	196	190	182	174	165	156	147	138	130	42.0	131.2
	1¾	222	216	209	200	191	181	172	162	152	143	46.1	144.2
	1½	242	235	227	218	208	197	187	176	166	156	50.2	156.9
	1½	261	254	245	235	224	213	201	190	179	168	54.2	169.4
14	1¾	242	236	229	221	212	203	193	183	173	164	50.1	156.5
	1½	264	258	250	241	231	221	210	199	189	178	54.5	170.4
	1½	285	278	270	260	250	238	227	215	204	193	58.9	184.1
	1½	306	298	289	279	268	256	243	231	219	207	63.2	197.4
15	1½	268	280	272	264	254	244	234	223	212	203	58.9	183.9
	1½	309	303	295	285	275	264	252	241	229	219	63.6	203.4
	1½	332	325	316	306	295	283	271	259	246	235	68.3	213.4
	1¾	354	346	337	327	315	302	288	276	263	251	72.8	227.6
16	1½	333	327	319	310	300	290	278	267	255	243	68.3	213.5
	1½	358	351	343	333	322	311	299	286	273	261	73.4	229.3
	1½	382	375	366	356	344	332	319	306	292	279	78.3	244.8
	1½	455	446	435	423	410	395	380	364	347	332	93.2	291.3

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN TONS OF 2,000 POUNDS FOR HOLLOW SQUARE AND
RECTANGULAR CAST IRON COLUMNS WITH SQUARE ENDS

Size in inches	Thick- ness in inches	LENGTH OF COLUMN IN FEET								Area of metal in inches	Weight per foot of length
		8	10	12	14	16	18	20	24		
4x6	$\frac{3}{4}$	41	34	28	.....	.....	.....	.....	.....	12.75	39.8
4x8	$\frac{3}{4}$	51	42	35	.....	.....	.....	.....	.....	15.75	49.2
4x9	$\frac{3}{4}$	56	46	39	.....	.....	.....	.....	.....	17.25	53.9
4x10	$\frac{3}{4}$	60	50	42	.....	.....	.....	.....	.....	18.75	58.6
4x12	$\frac{3}{4}$	70	59	49	.....	.....	.....	.....	.....	21.75	68.0
5x 8	$\frac{3}{4}$	64	55	48	41	.....	.....	.....	.....	17.25	53.9
	1	81	71	61	53	.....	.....	.....	.....	22.00	68.8
5x 9	$\frac{3}{4}$	69	60	52	45	.....	.....	.....	.....	18.75	58.6
	1	89	78	67	58	.....	.....	.....	.....	24.00	75.0
5x10	$\frac{3}{4}$	75	65	57	49	.....	.....	.....	.....	20.25	63.3
	1	96	84	73	63	.....	.....	.....	.....	26.00	81.3
5x12	$\frac{3}{4}$	86	74	65	56	.....	.....	.....	.....	23.25	72.7
	1	111	97	84	72	.....	.....	.....	.....	30.00	93.8
6x 6	$\frac{3}{4}$	63	57	51	45	40	35	.....	.....	15.75	49.2
	1	80	72	65	57	51	45	.....	.....	20.00	62.5
6x 8	$\frac{3}{4}$	75	68	60	54	47	42	.....	.....	18.75	58.6
	1	96	87	78	69	61	54	.....	.....	24.00	75.0
6x 9	$\frac{3}{4}$	81	73	65	58	51	45	.....	.....	20.25	63.3
	1	104	94	84	75	66	58	.....	.....	26.00	81.3
6x10	$\frac{3}{4}$	87	79	70	62	55	49	.....	.....	21.75	68.0
	1	112	101	91	80	71	63	.....	.....	28.00	87.5
6x12	$\frac{3}{4}$	99	90	80	71	63	55	.....	.....	24.75	77.3
	1	129	116	104	92	81	72	.....	.....	32.00	100.0
6x15	$\frac{3}{4}$	117	106	95	84	74	66	.....	.....	29.25	91.4
	1	153	138	123	109	97	85	.....	.....	38.00	118.8
7x 7	$\frac{3}{4}$	80	73	67	61	55	49	44	.....	18.75	58.6
	1	102	94	85	78	70	63	57	.....	24.00	75.0
7x 9	$\frac{3}{4}$	92	85	77	70	63	57	51	.....	21.75	68.0
	1	119	109	100	91	82	74	66	.....	28.00	87.5
7x12	$\frac{3}{4}$	111	102	93	85	77	69	62	.....	26.25	82.0
	1	144	133	121	110	99	89	80	.....	34.00	106.3
8x 8	$\frac{3}{4}$	95	90	83	77	70	64	59	49	21.75	68.0
	1	124	115	107	99	91	83	76	63	28.00	87.5
	$1\frac{1}{4}$	148	140	129	119	109	100	91	76	33.75	105.5
8x10	$\frac{3}{4}$	109	103	95	87	80	73	67	55	24.75	77.3
	1	141	132	122	113	104	95	86	72	32.00	100.0
	$1\frac{1}{4}$	170	161	148	137	125	115	105	87	38.75	121.1
8x12	$\frac{3}{4}$	122	115	106	98	90	82	75	62	27.75	86.7
	1	158	148	138	127	116	107	97	81	36.00	112.5
	$1\frac{1}{4}$	192	181	167	154	142	130	118	98	43.75	136.7

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

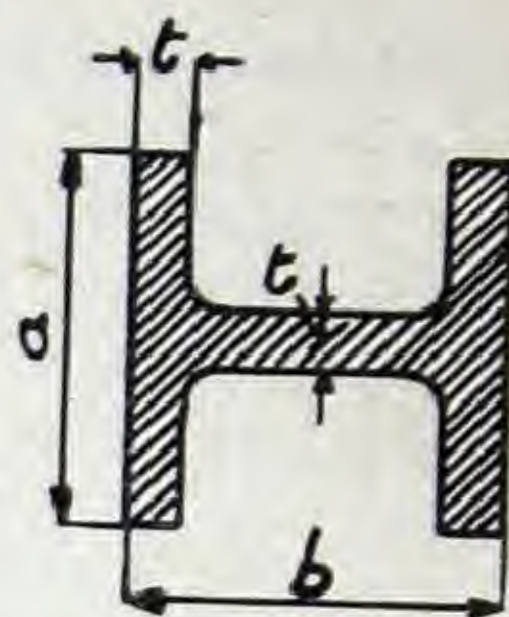
**SAFE LOADS IN TONS OF 2,000 POUNDS FOR HOLLOW SQUARE AND
RECTANGULAR CAST IRON COLUMNS WITH SQUARE ENDS**
(continued)

Size in inches	Thick- ness in inches	LENGTH OF COLUMN IN FEET								Area of metal in inches	Weight per foot of length
		8	10	12	14	16	18	20	24		
8x16	1	193	181	168	155	142	130	119	99	44.00	137.5
	1½	236	221	206	190	174	159	145	121	53.75	168.0
9x 9	¾	111	106	99	93	86	80	74	63	24.75	77.3
	1	144	137	129	120	112	103	96	85	32.00	100.0
9x12	1	171	162	153	143	133	123	114	97	38.00	118.8
	1½	209	198	186	174	162	149	138	118	46.25	144.5
9x16	1	207	196	185	173	161	149	138	117	46.00	143.8
	1½	254	240	226	212	197	182	168	143	56.25	175.8
10x10	1	165	158	150	142	133	125	117	101	36.00	112.5
	1½	201	193	183	172	162	152	142	123	43.75	136.7
10x12	1	184	176	167	158	148	139	129	112	40.00	125.0
	1½	224	214	204	192	181	169	158	137	48.75	152.3
10x15	1	211	202	192	181	170	160	149	129	46.00	143.8
	1½	258	247	235	222	209	195	182	158	56.25	175.8
10x16	1	220	211	200	189	178	167	155	135	48.00	150.0
	1½	270	258	245	232	218	204	190	165	58.75	183.6
10x18	1	239	228	217	205	193	181	168	146	52.00	162.5
	1½	293	280	266	251	236	221	207	179	63.75	199.2
10x20	1	257	246	234	221	208	194	181	157	56.00	175.0
	1½	316	302	287	271	255	239	223	193	68.75	214.9
10x24	1	294	281	267	252	237	222	207	180	64.00	200.0
	1½	362	346	329	311	292	274	255	221	78.75	246.1
12x12	¾	183	177	171	164	156	149	141	126	38.90	121.7
	1	207	201	193	185	177	168	159	142	44.00	137.5
	1½	253	245	236	223	216	206	195	174	53.75	168.0
	1¾	296	288	277	265	253	241	228	204	63.00	196.9
12x15	1	235	228	220	211	201	191	181	162	50.00	156.3
	1½	288	280	269	258	246	234	222	198	61.25	191.4
12x16	1	245	237	228	219	209	199	188	168	52.00	162.5
12x18	1	263	256	246	236	225	214	203	181	56.00	175.0
12x20	1	282	274	264	253	241	229	217	194	60.00	187.5
12x24	1	320	310	299	287	274	260	246	220	68.00	212.5
14x16	1	268	261	254	246	238	229	219	200	56.00	175.0
14x20	1	307	298	290	281	272	261	250	228	64.00	200.0
14x24	1	345	336	326	316	306	294	280	257	72.00	225.0
16x16	1	300	284	278	271	264	256	247	229	60.00	187.5
16x24	1	380	360	352	344	334	324	313	291	76.00	237.5
18x18	1	340	340	320	314	307	299	291	274	68.00	212.5
20x20	1	380	380	361	356	349	342	334	317	76.00	237.5
20x24	1	420	420	399	393	386	378	369	351	84.00	262.5

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN TONS OF 2,000 POUNDS FOR H-SHAPED CAST IRON COLUMNS

Size of column in inches			Area in inches	Length of column in feet							
a.	b.	t.		10	12	13	14	15	16	18	20
6x	6x	$\frac{3}{4}$	$12\frac{3}{8}$	41	36	33	31				
		1	16	53	46	43	40				
		$1\frac{1}{4}$	$19\frac{3}{8}$	64	56	52	48				
6x	8x	$\frac{3}{4}$	$13\frac{7}{8}$	46	40	37	34				
		1	18	60	52	48	45				
		$1\frac{1}{4}$	$21\frac{7}{8}$	73	63	59	54				
7x	7x1		19	69	62	58	55	52	49	43	38
		$1\frac{1}{4}$	$23\frac{1}{8}$	84	75	71	67	63	59	53	46
7x	9x1		21	76	68	64	61	57	54	48	42
		$1\frac{1}{4}$	$25\frac{5}{8}$	93	83	79	74	70	66	59	51
8x	8x	$\frac{3}{4}$	$16\frac{7}{8}$	66	60	57	54	51	49	44	39
		1	22	86	78	74	70	67	64	57	51
		$1\frac{1}{4}$	$26\frac{7}{8}$	105	95	91	86	82	78	70	63
8x10x1			24	93	85	81	77	73	69	62	56
		$1\frac{1}{4}$	$29\frac{3}{8}$	114	104	99	94	90	85	76	69
		$1\frac{1}{2}$	$34\frac{1}{2}$	134	122	117	111	105	100	89	81
9x	9x1		25	102	94	91	87	83	79	72	66
		$1\frac{1}{4}$	$30\frac{5}{8}$	125	116	111	106	102	97	89	81
		$1\frac{1}{2}$	36	147	136	130	125	120	114	104	95
9x10x1			26	106	98	94	90	86	83	75	69
		$1\frac{1}{4}$	$31\frac{7}{8}$	130	120	115	111	106	101	92	84
		$1\frac{1}{2}$	$37\frac{1}{2}$	153	142	136	130	125	119	108	99
10x10x1			28	118	111	107	103	99	95	88	81
		$1\frac{1}{4}$	$34\frac{3}{8}$	145	136	131	127	122	127	108	100
		$1\frac{1}{2}$	$40\frac{1}{2}$	171	160	155	149	144	138	128	117
		$1\frac{3}{4}$	$46\frac{3}{8}$	196	184	177	171	165	158	146	134
10x12x1			30	127	119	115	111	106	102	94	87
		$1\frac{1}{4}$	$36\frac{7}{8}$	156	146	141	136	131	126	116	107
		$1\frac{1}{2}$	$43\frac{1}{2}$	184	172	166	160	154	148	137	126
		$1\frac{3}{4}$	$49\frac{7}{8}$	211	198	191	184	177	170	157	144
		2	56	236	222	214	207	199	191	176	162
12x12x1			34	151	144	140	136	132	128	121	113
		$1\frac{1}{4}$	$41\frac{7}{8}$	186	177	172	167	163	158	149	139
		$1\frac{1}{2}$	$49\frac{1}{2}$	220	209	203	198	193	187	177	165
		$1\frac{3}{4}$	$56\frac{7}{8}$	252	241	234	227	221	216	202	189
		2	64	284	271	263	256	249	242	227	213
12x14x1 $\frac{1}{4}$			$44\frac{3}{8}$	197	188	183	177	173	168	158	148
		$1\frac{1}{2}$	$52\frac{1}{2}$	233	222	216	210	204	199	186	174
		$1\frac{3}{4}$	$60\frac{3}{8}$	268	255	248	241	235	228	214	201
		2	68	302	288	280	272	265	257	241	226
		$2\frac{1}{4}$	$75\frac{3}{8}$	335	319	310	301	292	285	268	251



When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

SAFE LOADS IN TONS FOR STANDARD STEEL BEAMS USED AS COLUMNS OR STRUTS

Strains per square inch: $13,500 - 50 \frac{l}{r}$

UNSUPPORTED SIDEWAYS

Size, ins.	Weig't lbs.	r	Area of secti'n	Length in feet					
				9	10	11	12	13	14
15 in.	42.00	1.08	12.48	53.04	49.57	46.11	42.65	39.19	.....
	50.00	1.04	14.71	61.12	56.85	52.62	48.38	44.13	.....
	60.00	1.21	17.67	79.87	75.45	71.12	66.70	62.33	57.95
12 in.	31.50	1.01	9.26	37.76	35.00	32.24	29.50	.....	.....
	35.00	0.99	10.29	41.39	38.28	35.16	32.05	.....	.....
	40.00	1.08	11.84	50.32	47.03	43.75	40.46	37.18	.....
10 in.	25.00	0.97	7.37	29.24	26.95	24.67	22.40	.....	.....
	40.00	0.90	11.76	44.10	40.19	36.28	.....	.....	.....
9 in.	21.00	0.90	6.31	23.66	21.56	19.46	.....	.....	.....
	35.00	0.84	10.29	36.40	32.72	.....	.....	.....	.....
8 in.	18.00	0.84	5.33	18.85	16.95	.....	.....	.....	.....
	25.50	0.80	7.50	25.31	22.50	.....	.....	.....	.....

SUPPORTED SIDEWAYS

8 in.	18.00	3.27	5.33	31.58	31.08	30.59	30.11	29.62	29.14
	25.50	3.02	7.50	43.93	43.17	42.43	41.68	40.95	40.20
7 in.	15.00	2.86	4.42	25.67	25.20	24.74	24.27	23.81	23.35
	20.00	2.68	5.88	33.76	33.10	32.45	31.79	31.13	30.47
6 in.	12.25	2.46	3.61	20.40	19.96	19.53	19.09	18.64	18.20
	14.75	2.35	4.34	24.31	23.76	23.21	22.65	22.09	21.53
	17.25	2.27	5.07	28.19	27.52	26.86	26.18	25.51	24.84
5 in.	9.75	2.05	2.87	15.59	15.17	14.75	14.33	13.91	13.49
	12.25	1.94	3.60	19.29	18.73	18.18	17.62	17.06	16.50
	14.75	1.87	4.34	23.03	22.33	21.63	20.94	20.24	19.55
4 in.	7.50	1.64	2.21	11.28	10.87	10.47	10.06	9.66	9.26
	10.50	1.52	3.09	15.37	14.76	14.15	13.54	12.93	12.32
3 in.	5.50	1.23	1.63	7.42	7.02	6.63	6.23	5.83	5.43
	7.50	1.15	2.21	9.73	9.15	8.57	8.00	7.42	6.84

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Ornamental Iron

FIRE ESCAPES

A modern fire escape consists of one or more balconies or landings securely fastened to the wall of a building opposite some convenient exit, either door or window, with a ladder or stairway so placed that the occupants of the building can reach the ground in safety from any balcony in case of fire. The fire escape, including stairs and ladder, should be constructed of steel, wrought iron or a combination of both. Fire escapes may be plain or as ornamental as required. In every case the balconies or landings, with their supporting brackets, should be strong enough to safely carry as many people as can be crowded on to them. It is usual to provide a ladder extending from the topmost balcony to the roof. Several styles of fire escapes are illustrated herewith, some plain and some ornamental. At the lowest balcony a drop ladder or stairway is usually provided, which may be kept off the ground when not in use. Stairs with counterweights are shown by No. 99 and a ladder with counterweights by Nos. 94 and 95.

Our Standard Fire Escape, designed to conform to by-laws of the city of Winnipeg, is the most serviceable and least expensive on the market to-day. Several hundred have been sold during the past few years. The balconies consist of steel angle frame work with flat steel strap floor, carried on strongly made steel brackets. Either ladder or stairs are provided, as required. The ladders are well made, and if properly attached to wall will safely carry as many people as can get on them at one time. The stairs have steel channel strings, with corrugated cast iron treads, no risers. These fire escapes are shown by Nos. 89, 90 and 91. We sell these standard fire escapes F.O.B. Winnipeg, made up with all fittings ready for erection, For prices see page 61.

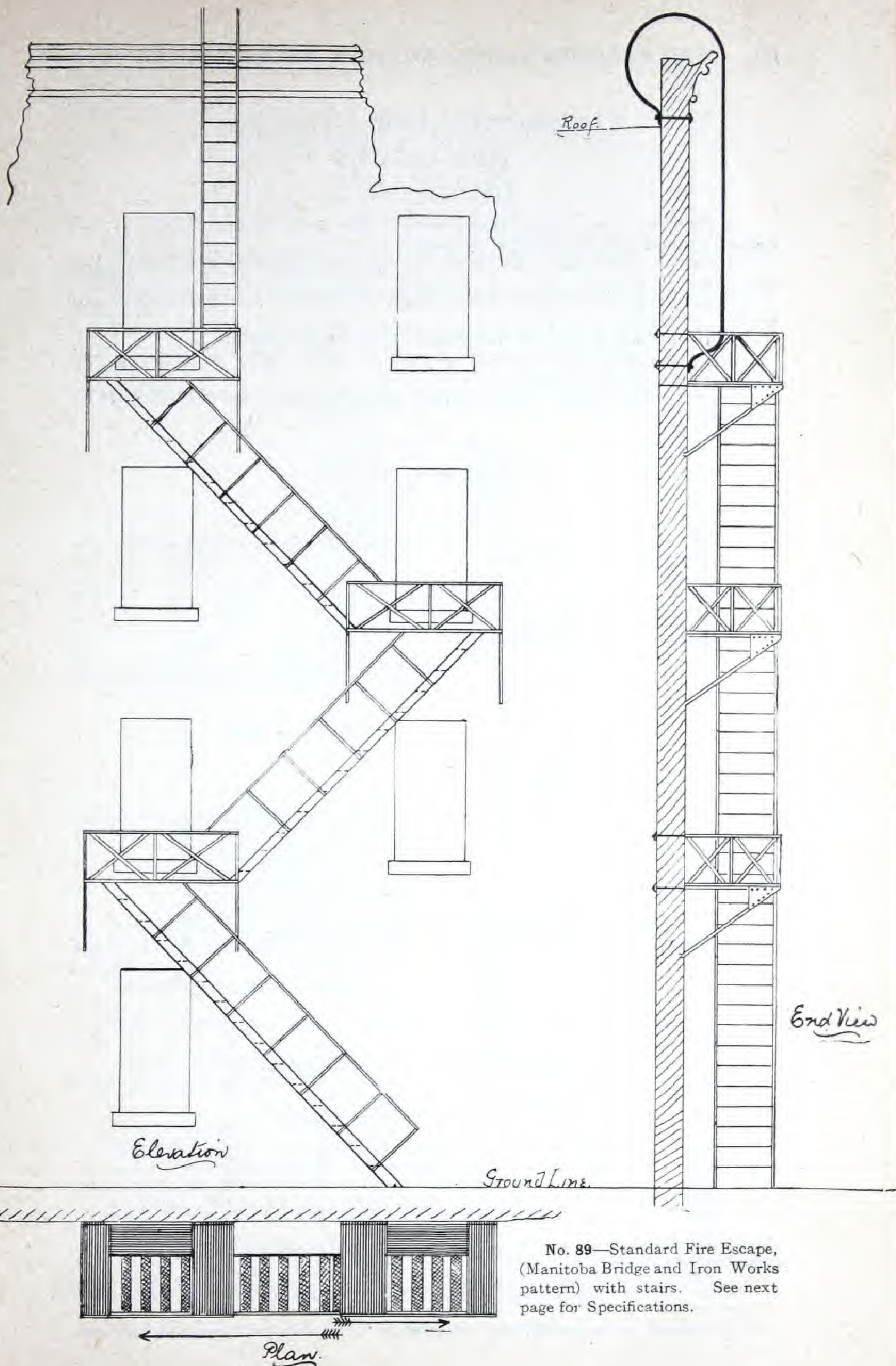
If counterweights, pulleys and wire rope equipment is wanted add \$15.00 to price of fire escape.

Balconies and stairs may have either angle railings or pipe railings. Angle railings are the least expensive and being made of steel will, if properly painted, last as long as any other kind. When fire escapes are ordered we will always furnish steel angle railings to both stairs and balconies unless otherwise instructed.

When ordering or asking for prices on fire escapes it is necessary for us to have the following information:

- A—Length and width of balcony.
- B—Whether angle or pipe railing is required.
- C—Location of stair or ladder opening in floor or balcony; whether at right, left, or in centre.
- D—Number of lineal feet of ladder.
- E—Whether opening in floor for stand pipe is to be provided or not.
- F—Whether ladder or stairs are required.
- G—Whether ladder is to be attached to wall or to outside of frame work of balcony.
- H—Thickness of wall at each landing, so that we may know what length to make the bracket bolts.
- I—Width and height of parapet on roof, if any.
- J—Projection and depth of cornice, if any.
- K—If stairs are wanted, always give the "rise" and the "run". By "rise" we mean the vertical height from ground level to floor of lowest balcony, or vertical height from the floor of each balcony to the floor of the one above. The "run" means the length of base of a triangle of which the stairs form the diagonal or longest side. Considering any flight or section of stairs, the stairs themselves would be one side (diagonal) of a triangle, the "rise" would be the vertical side and the "run" the base. These measurements should be given as correctly as possible to avoid mistakes.

When ordering or asking for prices, read carefully, "Instructions to Buyers" on page 216



Ornamental Iron — *Continued*

FIRE ESCAPES

SPECIFICATIONS

Balconies, steel angle frame-work: flat steel strap floor riveted, section of floor can be made to lift out.

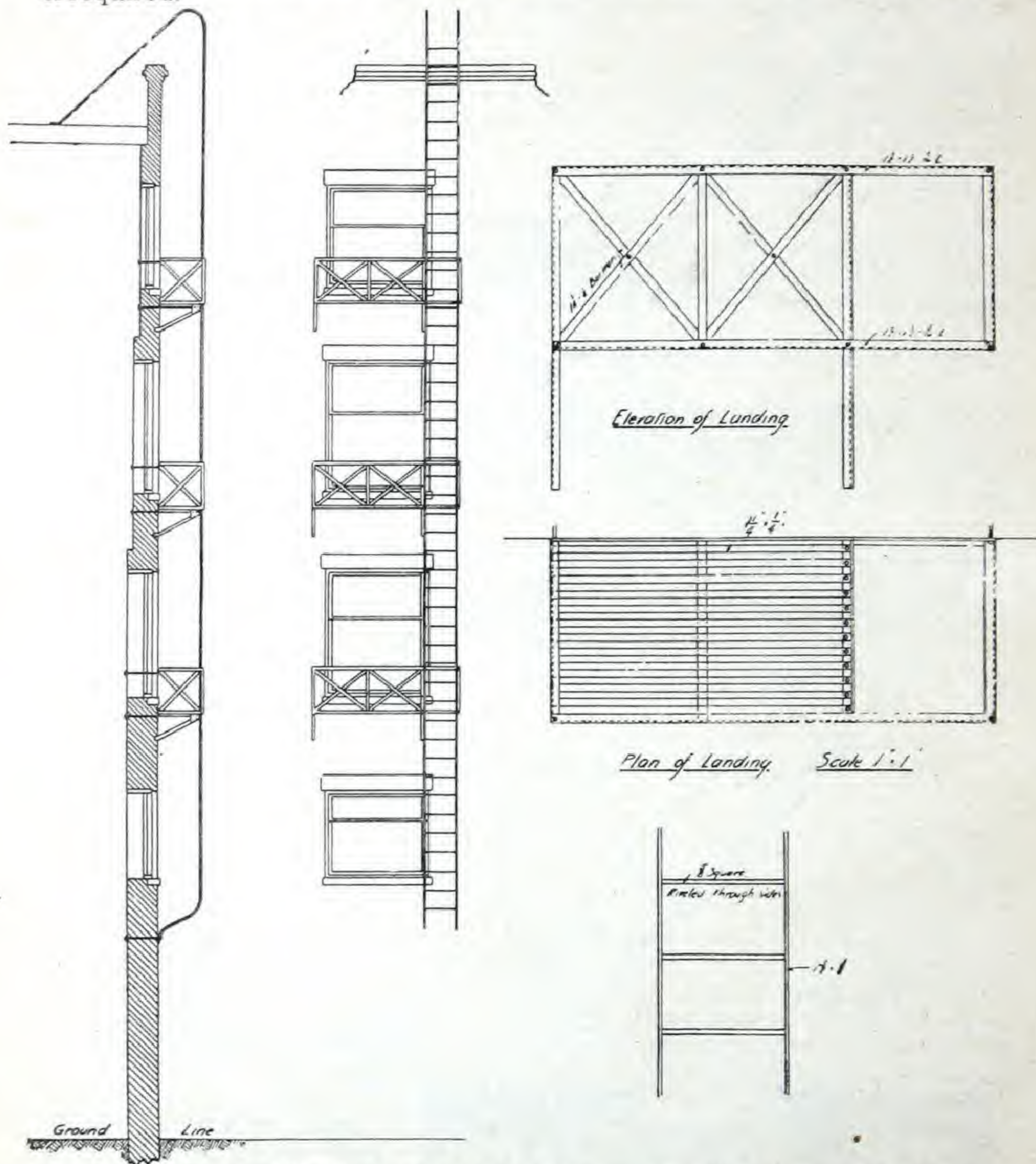
Brackets, steel angles and bolts through wall stiffened with steel plates at angles.

Stair stringers, 5-in. or 6-in., steel channels: corrugated cast iron treads, no risers.

Stair railing made of steel angles, steel ladder to roof.

Balconies and stairs strong enough to safely carry as many people as can be crowded on them.

Lower stairs fitted with weights same as shown by No. 99, page 66, if required.



No. 90.—Standard Fire Escape (Manitoba Bridge and Iron Works pattern) with ladder. See next page for specifications.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Ornamental Iron—*Continued*

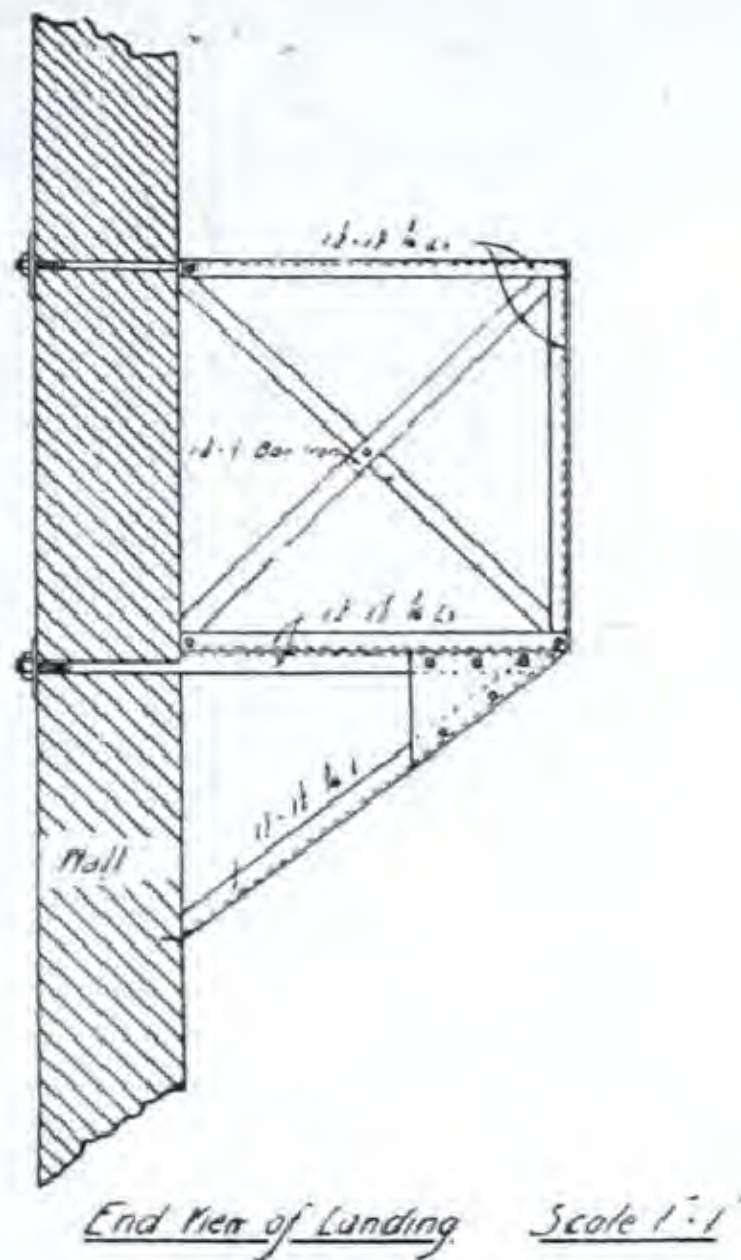
FIRE ESCAPES

SPECIFICATIONS

Balconies—Steel angle framework, flat steel strap floor riveted. Sections of floor can be made to lift out.

Brackets—Steel angles and bolts through wall, stiffened at angle with steel plate.

Ladders—Side bars $1\frac{1}{2}$ in. x $\frac{5}{8}$ in. steel; rungs $\frac{5}{8}$ in. square bars.



No. 91—Showing End View of balcony for Standard Fire Escapes.

PRICES—Fire Escape with Stairs

Balconies—\$1.25 per square foot of area including opening for stairs, and also brackets. Shipping weight per square foot 19 pounds, including opening and brackets.

Ladder—60 cents per lineal foot. Shipping weight 6 pounds per lineal foot.

Stairs—\$2.30 per lineal foot. Shipping weight 35 pounds per lineal foot.

When ordering, state length and width of balcony, rise and run of stairs, length of ladder to roof.

PRICES—Fire Escape with Ladder

Balconies—\$1.25 per square foot of area including ladder opening and brackets. Shipping weight 19 pounds per square foot, including opening and brackets.

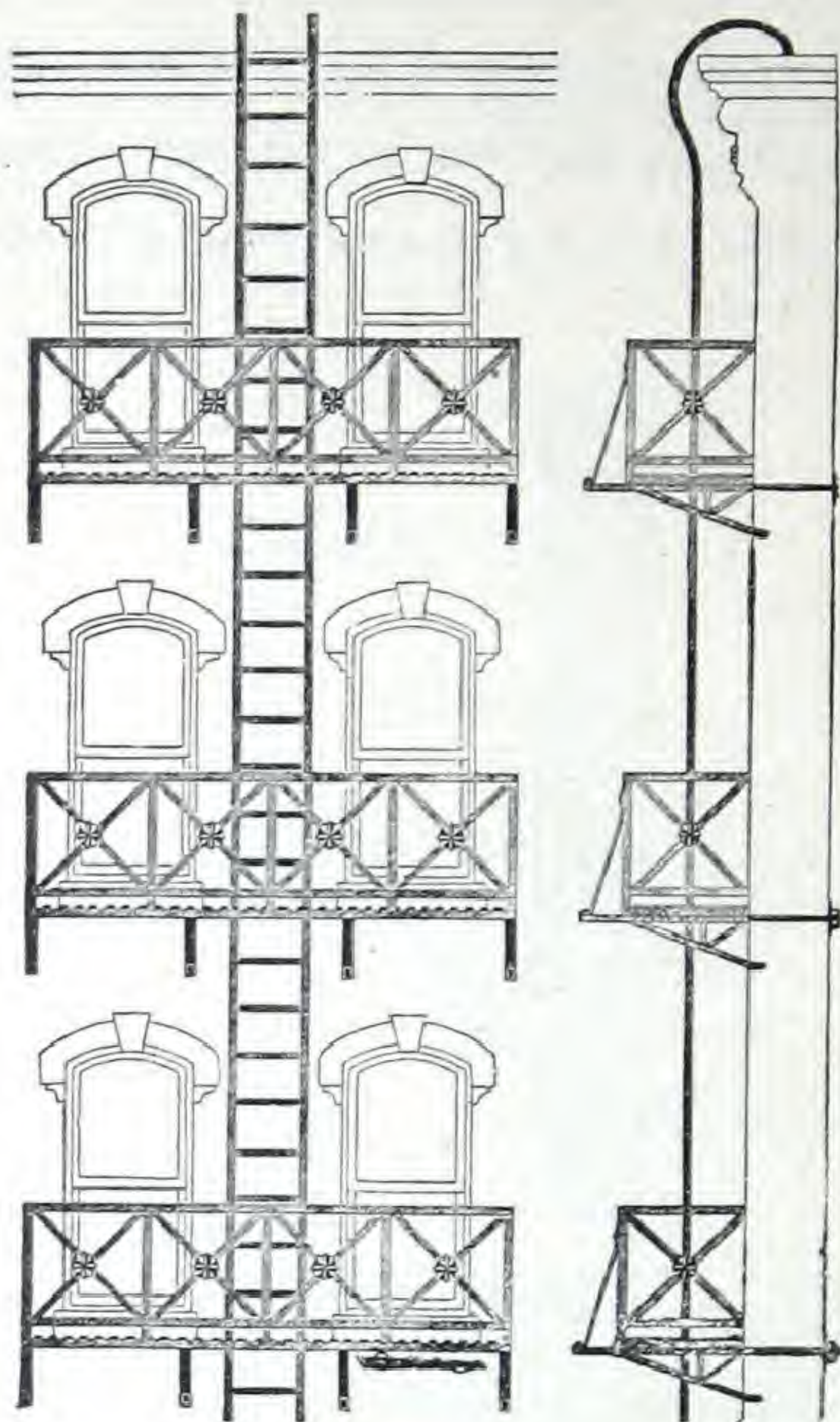
Ladder—60 cents per lineal foot. Shipping weight 6 pounds per lineal foot.

Entire Fire Escape is well made and both balconies and ladder will safely carry all the people which can get on them. When ordering state length and width of balconies and length of ladder required.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Ornamental Iron — *Continued*

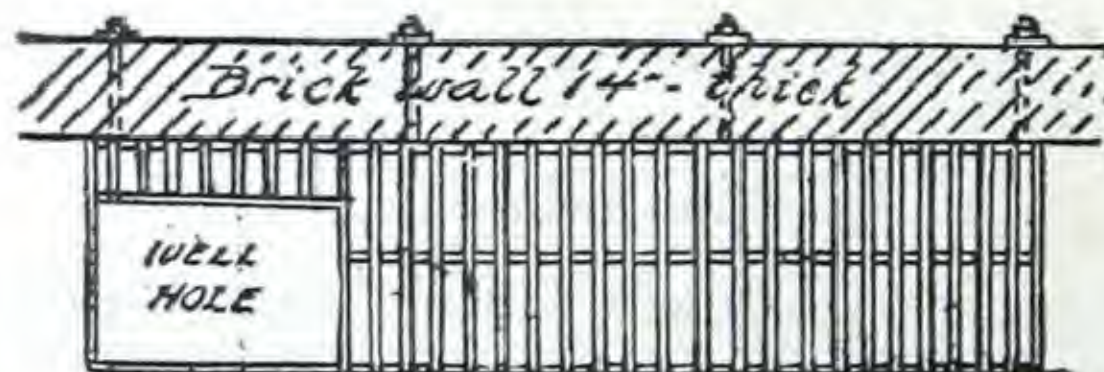
FIRE ESCAPES



No. 92

Plain, all steel, three Balcony Fire Escape.

Ladder from roof to ground. This illustrates how the brackets are attached to wall. Bolts should extend right through the wall, with nuts and washers on inside. Balconies should have angle railings or balustrades.



FLOOR PLAN

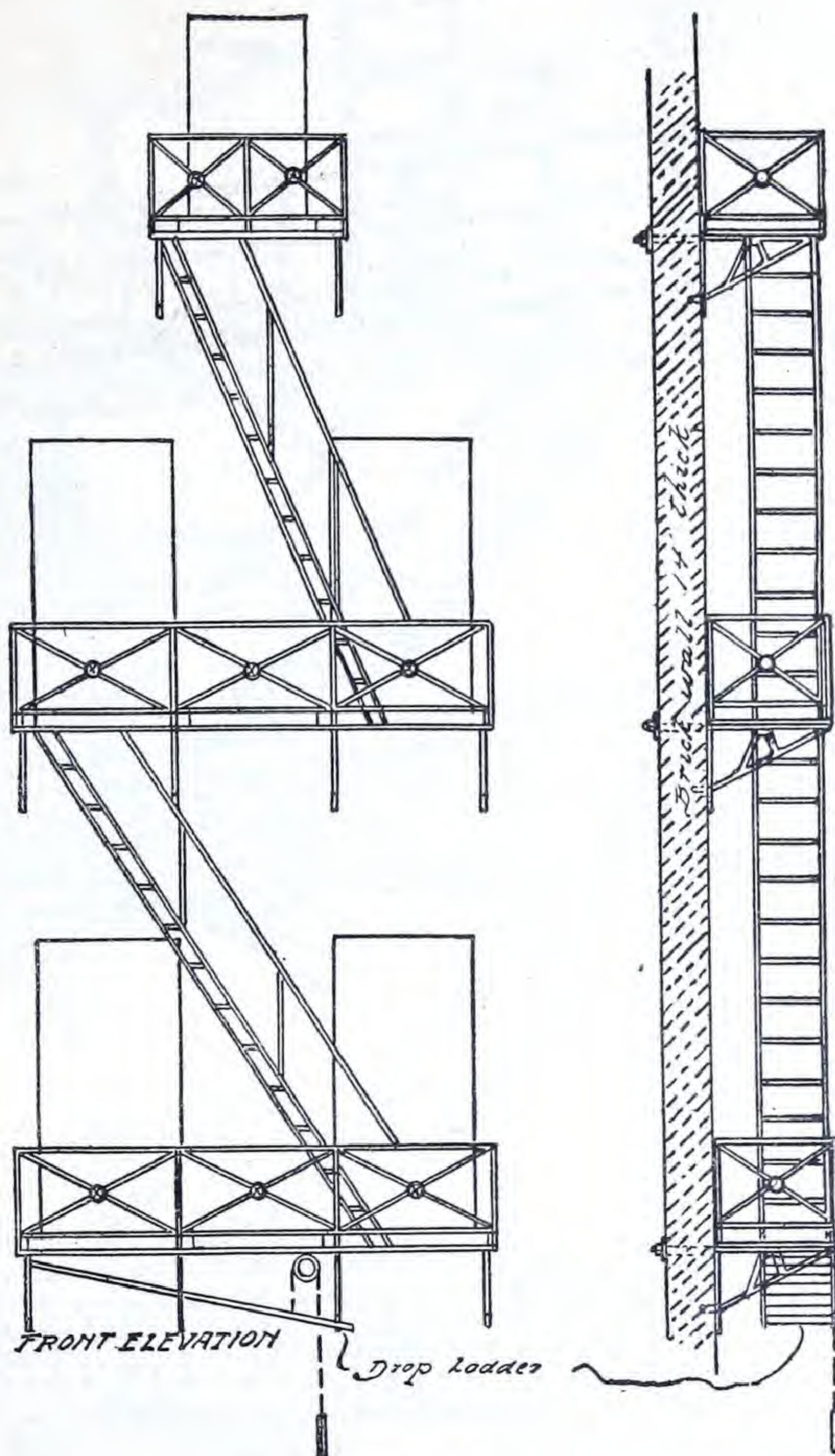
No. 93

Floor plan of balcony of Fire Escape No. 94, next page, strap floor, Straps placed flat, ladder or stair opening at end.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Ornamental Iron — *Continued*

FIRE ESCAPES



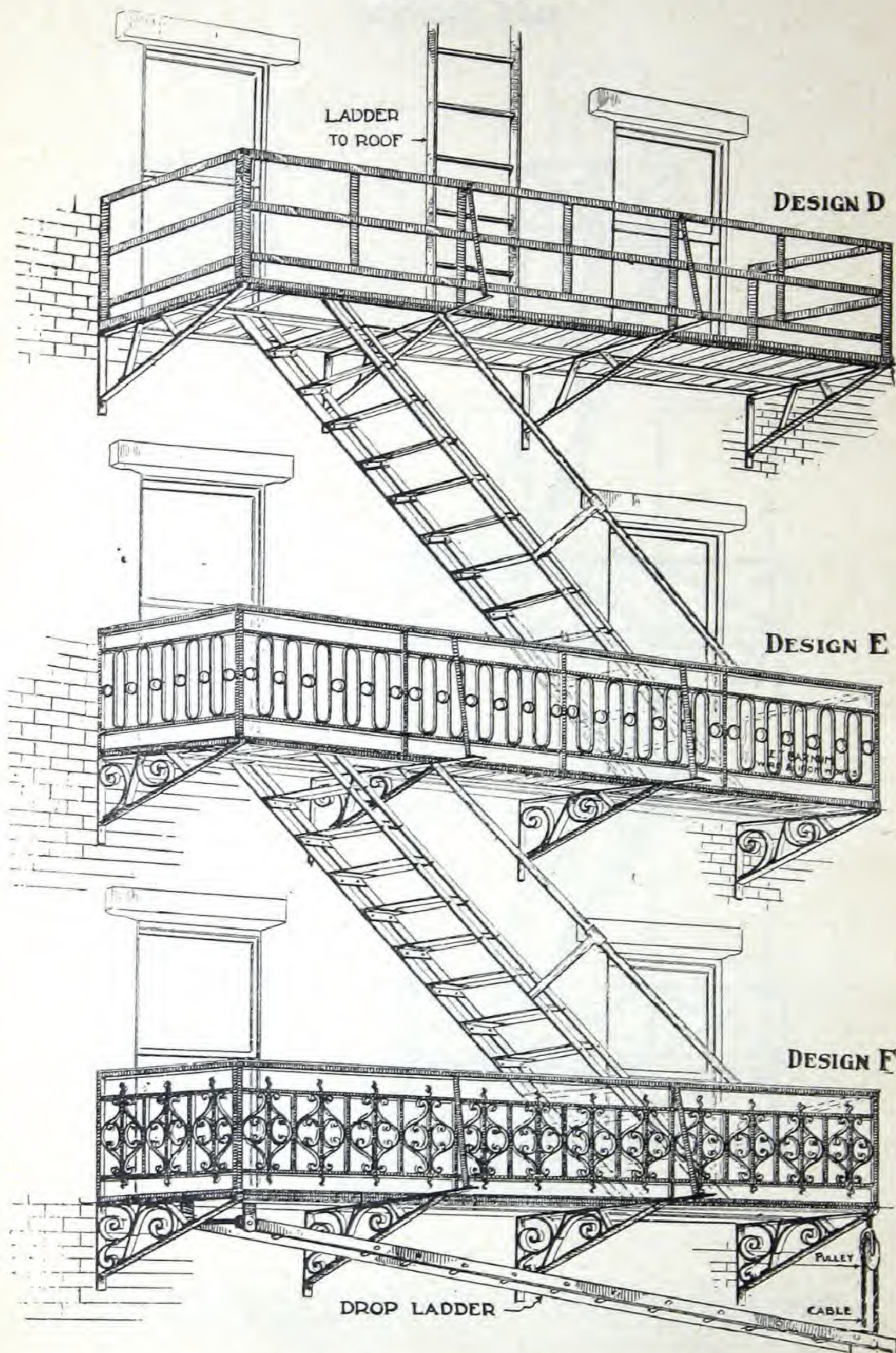
No. 94

Showing plain, all steel, three Landing Fire Escape. Landings connected by fixed stairs, drop ladder to ground; exits through windows. This illustration also shows bracket bolts passing through wall.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Ornamental Iron — *Continued*

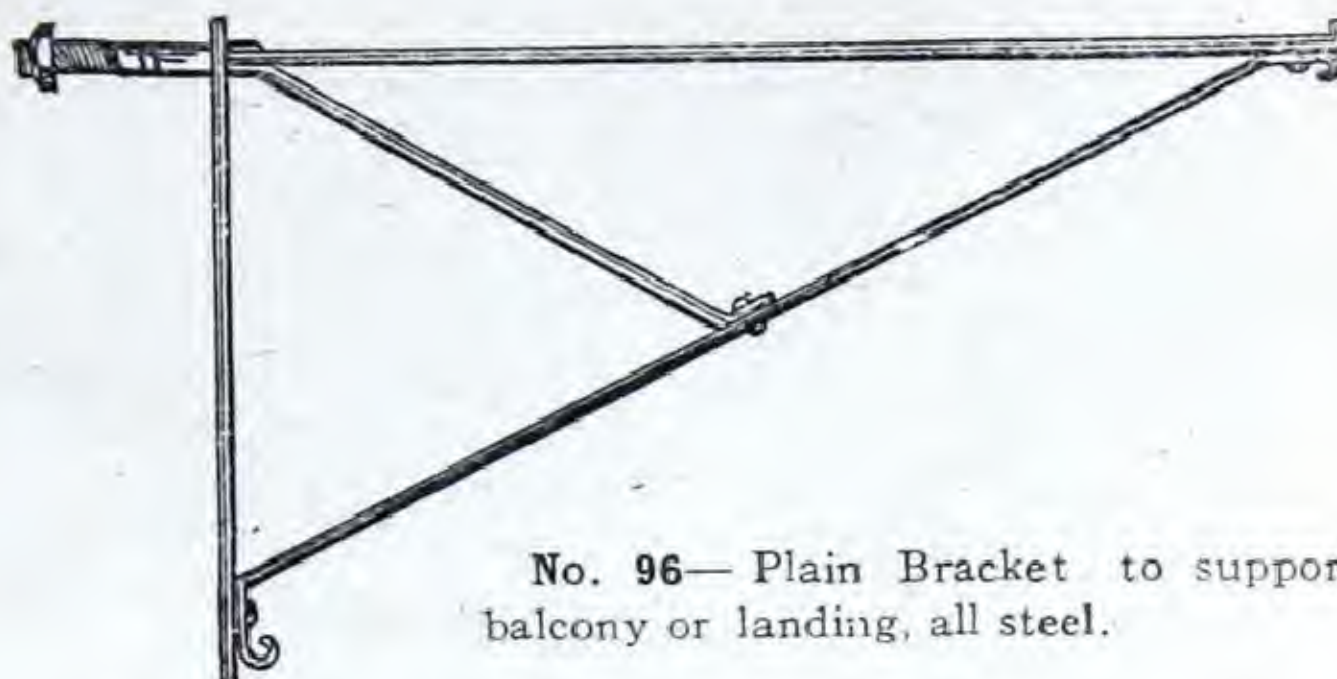
FIRE ESCAPES



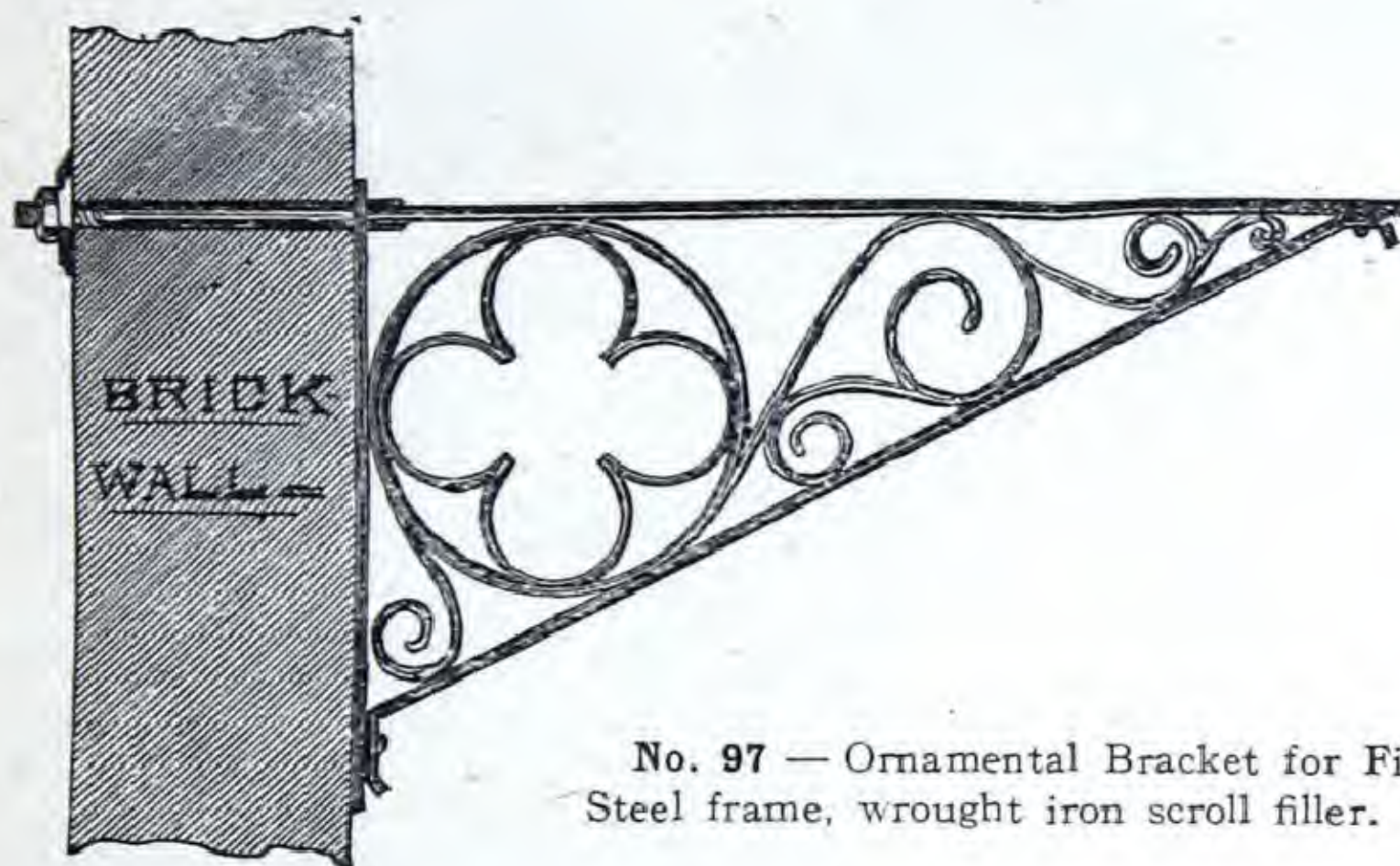
No. 95—Showing three styles of Balconies. Design D plain, E moderately ornamental, F ornamental. Exits through windows. Ladder to roof and drop ladder to ground.

Ornamental Iron—*Continued*

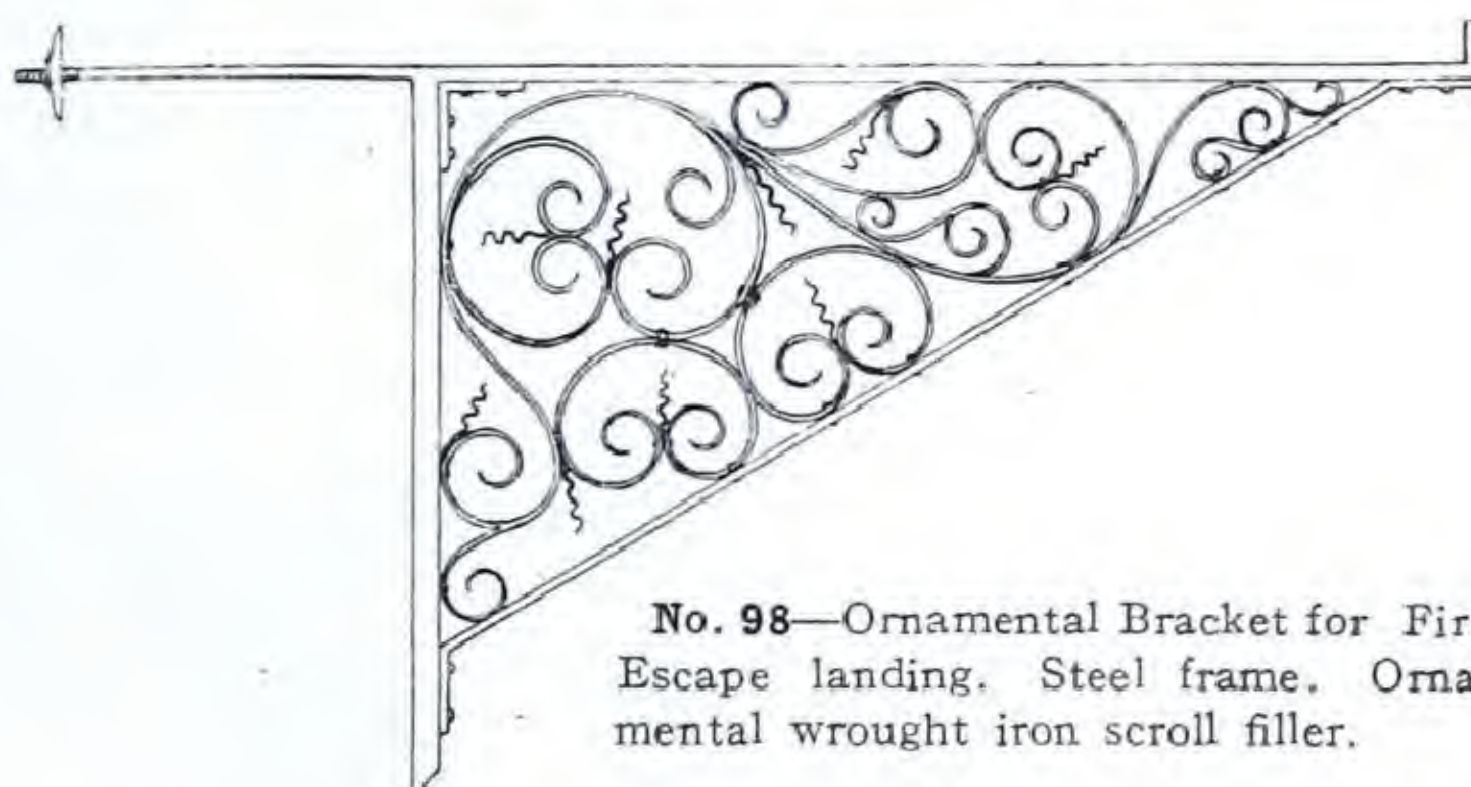
PLAIN AND ORNAMENTAL BRACKETS



No. 96— Plain Bracket to support balcony or landing, all steel.



No. 97 — Ornamental Bracket for Fire Escape balcony. Steel frame, wrought iron scroll filler.

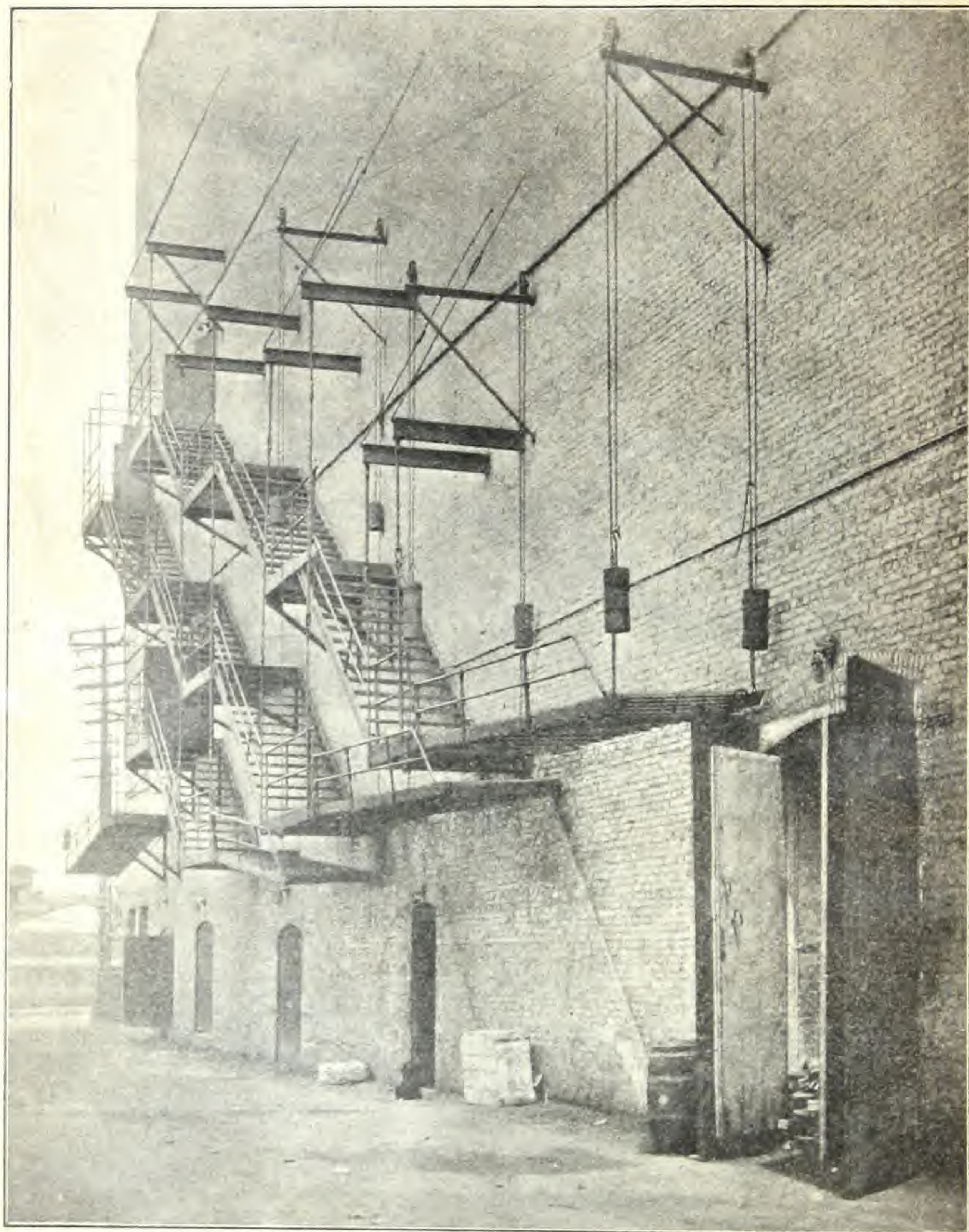


No. 98—Ornamental Bracket for Fire Escape landing. Steel frame. Ornamental wrought iron scroll filler.

Illustrations Nos. 96, 97 and 98, page 65, show styles of supporting brackets for fire escape landings or balconies. They can be made up as plain or as ornamental as required. Special designs furnished without charge to our customers. In every case the top bolt of bracket should pass clear through the wall as shown.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Ornamental Iron — *Continued* FIRE ESCAPES



No. 99 — Fire Escapes in rear of Theatre, showing lower stairs hung with counterweights.
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Ornamental Iron — *Continued*

FIRE ESCAPES



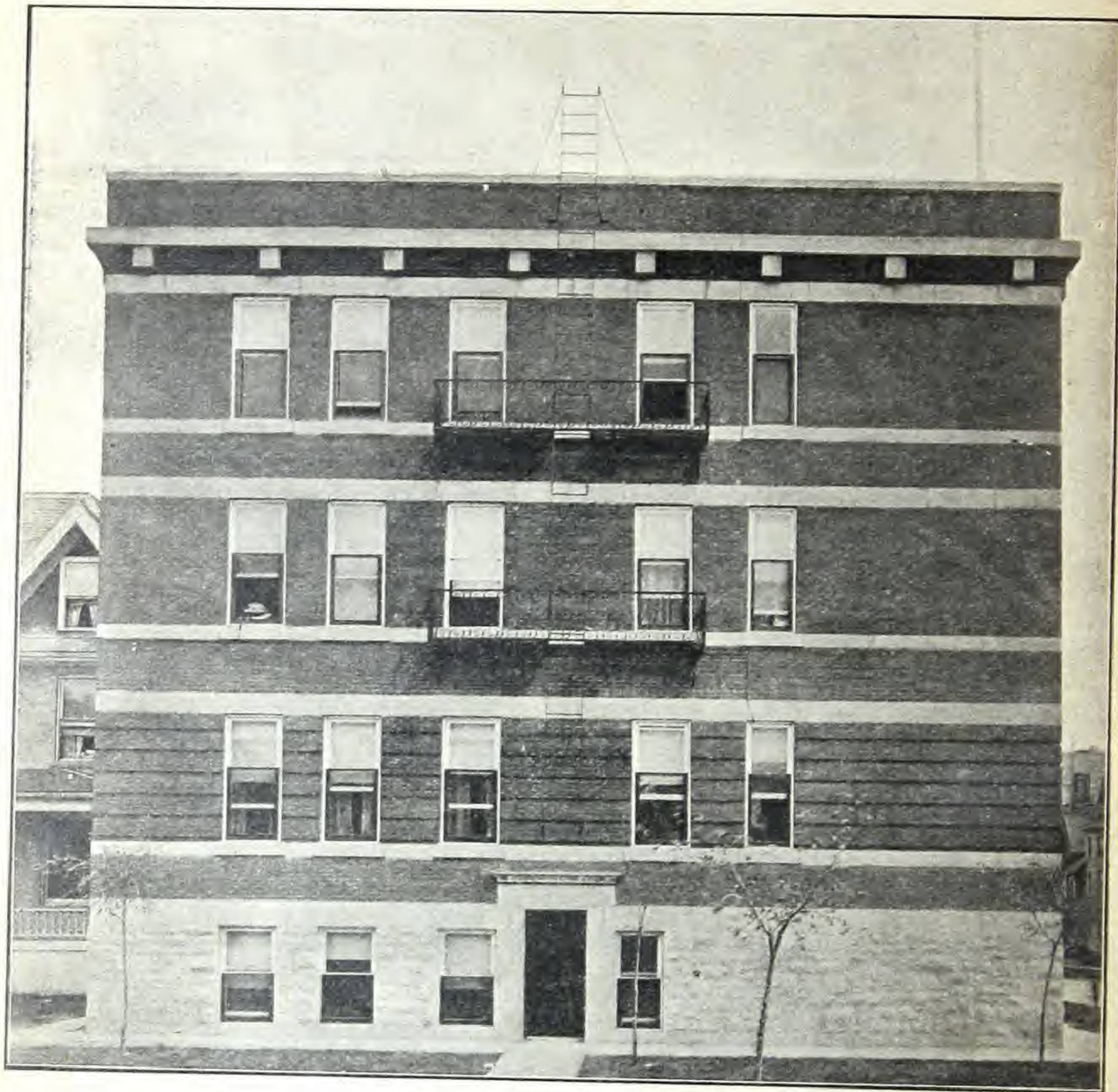
No. 100

Plain all-steel Fire Escapes for apartment house; ladders to roof. Landings connected by fixed stairways. Exits through doors at ends of halls. An economical and serviceable type of fire escape. Note size of landings. No ladders or stairs to ground as lowest balconies are placed close to ground level.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Ornamental Iron—*Continued*

FIRE ESCAPES



No. 101

Two Balcony Fire Escape erected on front wall of medium sized apartment house. Ornamental wrought iron balustrade or railing around each landing. Plain ladder extending from roof to a point just over front entrance door. Exits to balconies through windows.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216



No. 102—Fire Escapes for Apartment House, consisting of four ornamental iron Balconies with connecting ladder also Standpipe attached to Fire Escape.

Ornamental Iron — *Continued*

FIRE ESCAPES

When fire escapes, other than those illustrated, are required, sketches and measurements showing how they are to be made up must be forwarded to us before we can quote prices or manufacture them.

All fire escapes are assembled and properly fitted in our shops before shipment, and mistakes are not often made through any fault of ours. Workmanship is first-class.

STAND PIPES

To provide adequate fire protection it is customary, in modern building construction, to erect a stand pipe or riser at the same time that the fire escape is erected. No. 102, page 69, shows stand-pipes attached to the fire escapes on a large apartment building recently erected in Winnipeg. These stand-pipes extend from a convenient point near the ground, to the roof as shown. They are made of standard wrought iron pipe, either 2½, 3 or 4 in. in diameter. The several lengths of pipe are connected together with standard threaded couplings. At the ground end of riser a "Y" or "Siam-ese" special fire hose connection is provided, and at each landing and at roof a hose valve. These connections are threaded to take the hose, used in the city or town in which the building is located. In case of fire a hydrant or fire engine is connected to riser at ground end and lines of hose are run out from any or all of the valves at the landings and roof. Then, when the water is turned on, the interior of the building may be reached much more quickly and safely than if the fire hose had to be carried up through windows or doors. In buildings equipped with stand-pipes as illustrated by No. 102, it is customary to carry several lengths of hose on racks placed in the hallways near the exits to fire escape. In case of fire the hose can be quickly run out and connected to stand-pipe. Water is then available at any part of the building in a very few minutes. When stand-pipes are provided the cost of insurance is reduced, and this saving in insurance will pay for the equipment in a very few years, to say nothing of the extra protection in case of fire.

STEEL AND IRON STAIRS

In municipal buildings, hotels, apartment houses, theatres, churches, office buildings, etc., interior stairways should be made of steel or iron or a combination of both, because of their fire resisting qualities.

No. 103, page 71, illustrates our standard type of ornamental iron stairway. Posts or newels are cast iron, panelled. Stringers, both wall and well, are cast iron with exposed surfaces panelled, risers, well casings and curbs are of cast iron, with exposed surfaces pannelled; balustrade is wrought iron. As the treads are usually made of slate, stone or marble, metal treads are not furnished unless ordered. Dimensions of standard stairway are as follows:

Width of stairs, 4 feet.

Width of tread, 10 inches.

Height of riser, 7 inches.

Height of balustrade, 27 inches.

Width of stringer, 12 inches

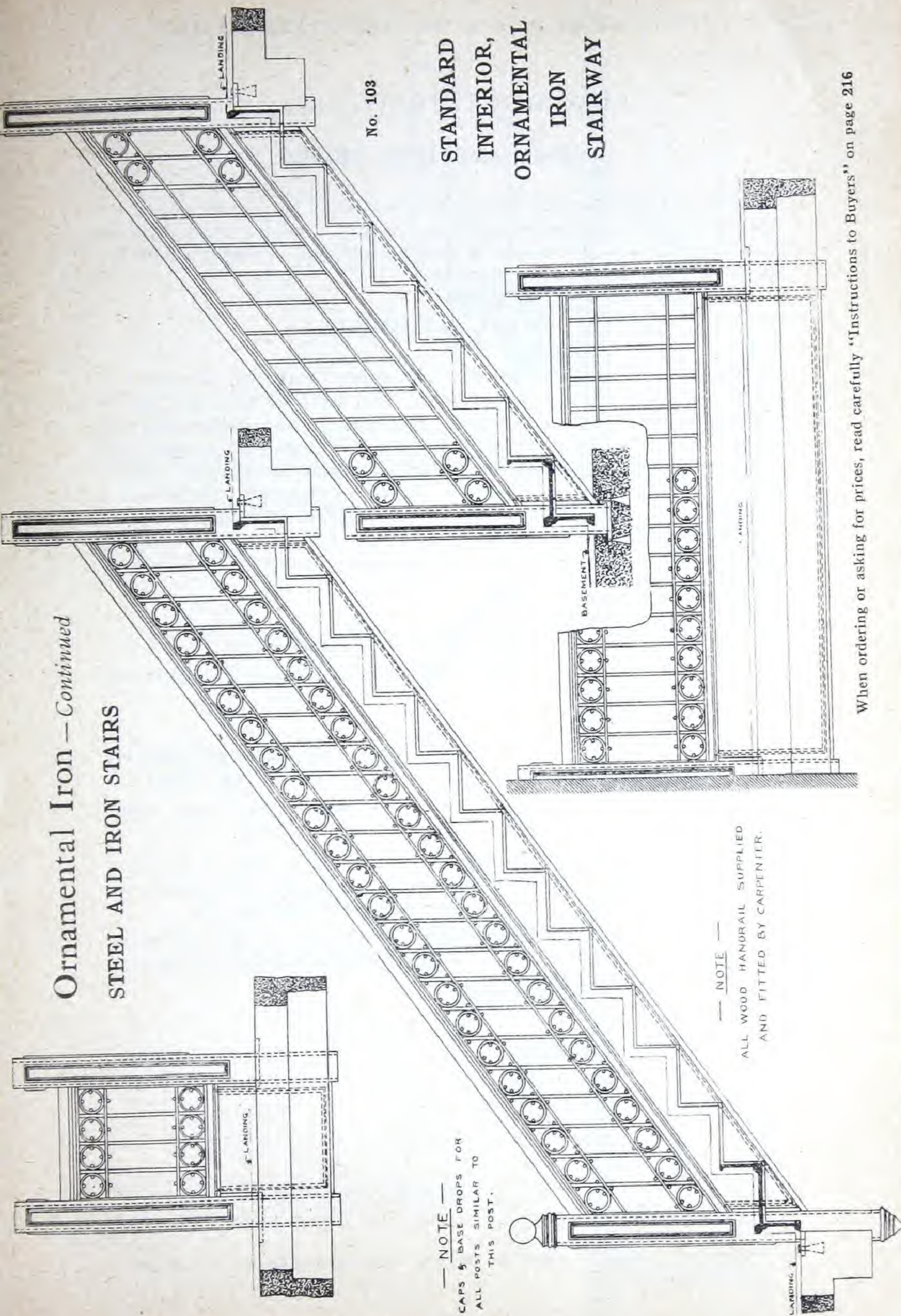
Width of well casing, 12 inches.
(varies with thickness of floor)

Cost per lineal foot of standard stair-way complete, ready for erection (treads not included) F.O.B. Winnipeg \$3.50.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Ornamental Iron — Continued

STEEL AND IRON STAIRS



No. 103

STANDARD INTERIOR, ORNAMENTAL IRON STAIRWAY

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Ornamental Iron — *Continued*

STEEL AND IRON STAIRS

We can of course manufacture ornamental stairs of any design wanted and will make them up in steel, wrought iron, cast iron, bronze, brass, imitation bronze or a combination of all the metals mentioned. Designs will be furnished without charge to our customers.

SPIRAL STAIRWAYS

are often called for. Nos. 104 and 105, pages 73 and 74, illustrate two styles, one plain and one ornamental. The width of the stairs can be made anywhere from 18 in. to 6 feet. Landings can be provided where required. The center or carrying post is made of standard wrought iron pipe fitted with floor plate and ball cap or ceiling plate as required. Treads are corrugated or open mesh cast iron. Risers are cast iron. Balustrade is of wrought iron. All workmanship on these stairs is first-class, and equal to any. Prices range from \$5.00 to \$25.00 per foot of rise depending on width of stairs, and amount of ornamental work required. When ordering give the following:

- A—Total height of stairs.
- B—Distance from finished floor to finished floor, each storey.
- C—Whether post is to extend to ceiling, or if not how far above top landing.
- E—Width or diameter of stairs.
- F—Size of well or floor openings, each floor. Sometimes full risers are wanted. Unless otherwise instructed we always furnish open risers.

We have many other designs of spiral stairs besides those shown, which we will furnish at any time to our customers without charge.

We have patterns in stock for spiral or circular stairs, 3, 3½, 4, 5 and 6 feet in diameter, plain stairs, with corrugated treads and consequently we can make up these sizes in a week or ten days after receiving order.

Shipping weights of spiral stairs range from 44 lbs. per foot of height for stairs 3 feet in diameter to 120 lbs. per lineal foot of height for stairs 6 feet in diameter.

Ornamental Iron — *Continued*
SPIRAL STAIRS



No. 104
Interior Spiral
Stairway—Plain.^m

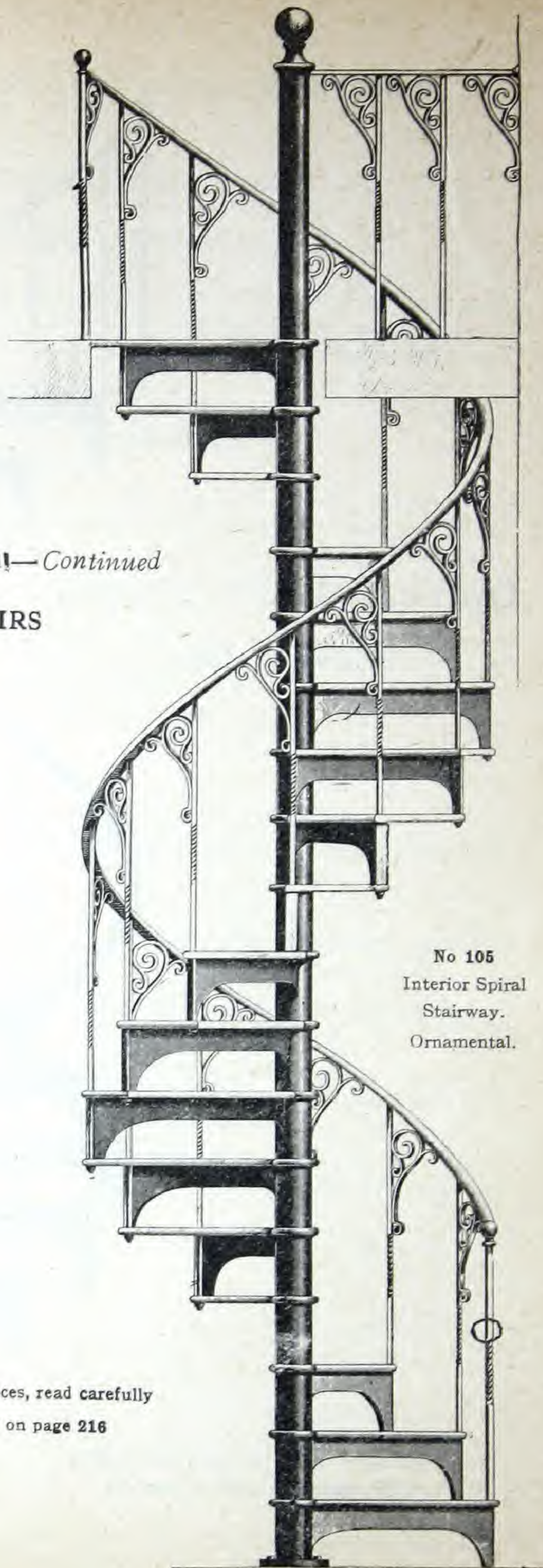
When ordering or asking for prices, read carefully
"Instructions to Buyers" on page 216

Ornamental Iron—*Continued*

SPIRAL STAIRS

No 105
Interior Spiral
Stairway.
Ornamental.

When ordering or asking for prices, read carefully
"Instructions to Buyers" on page 216



Ornamental Iron — *Continued*

IRON CRESTINGS

FOR DECK ROOFS, WALLS AND COPINGS

Besides the designs shown many other styles can be made up at reasonable cost.

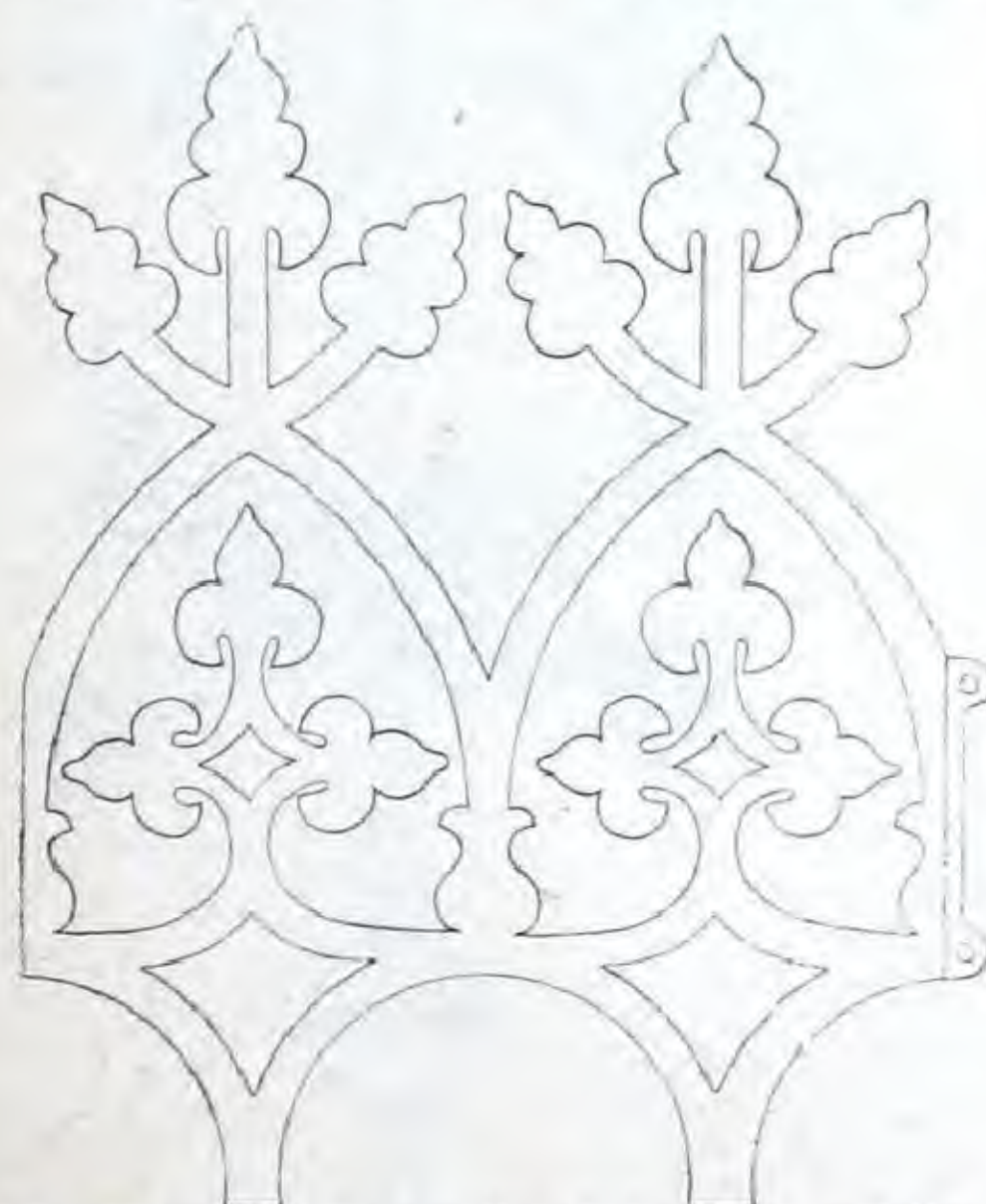


No. 106—Weight per lineal foot 8.4 lbs.
Price " " " 60c.

Corner Finals for any of these. \$1.25 each, extra.



No. 107—Weight per lineal foot 3 lbs.
Price " " " 45c.



No. 108—Weight per lineal foot 6 lbs.
Price " " " 65c.

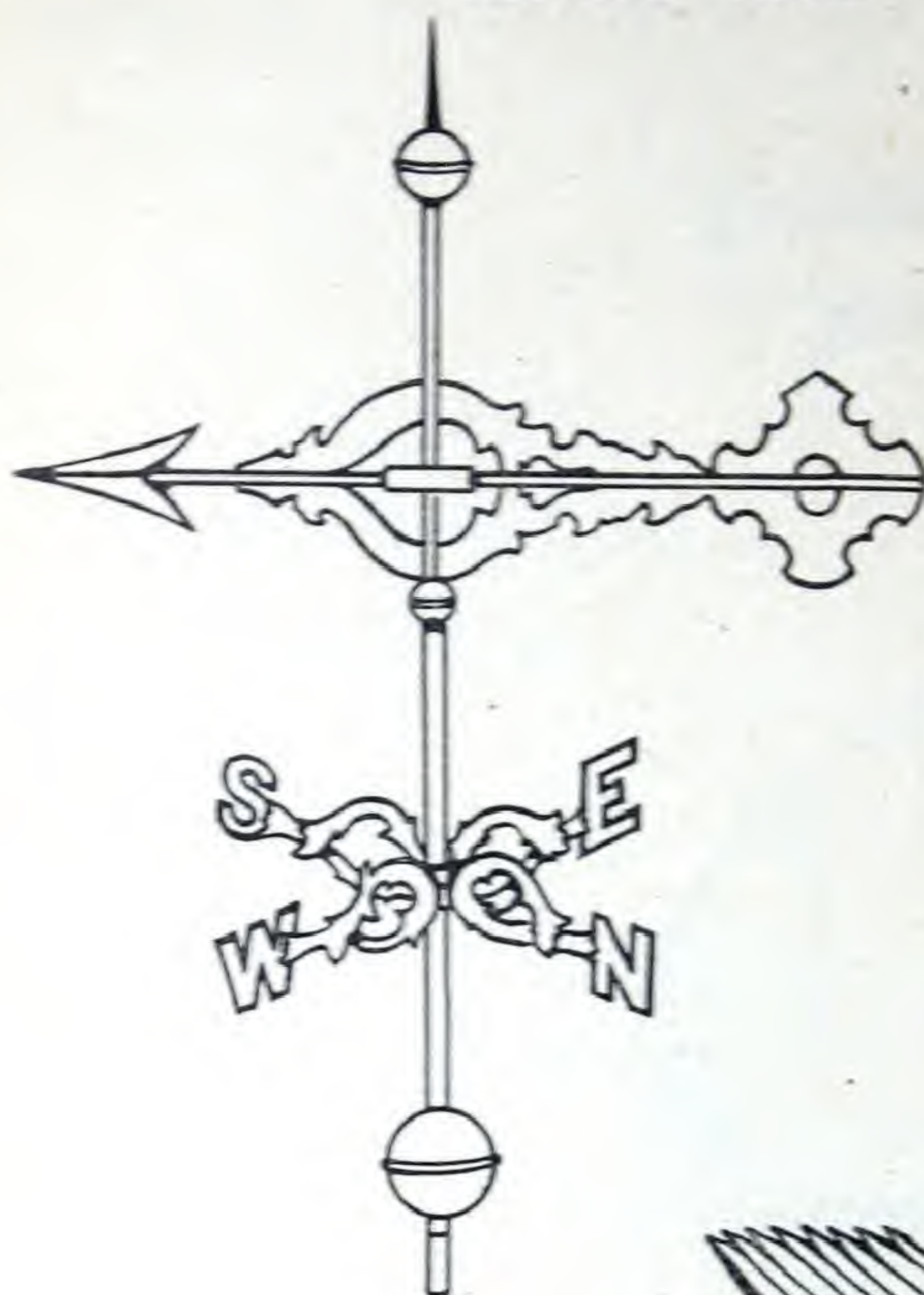


No. 109—Weight per lineal foot 9 lbs.
Price " " " 65c.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Ornamental Iron—*Continued*

WEATHER VANES

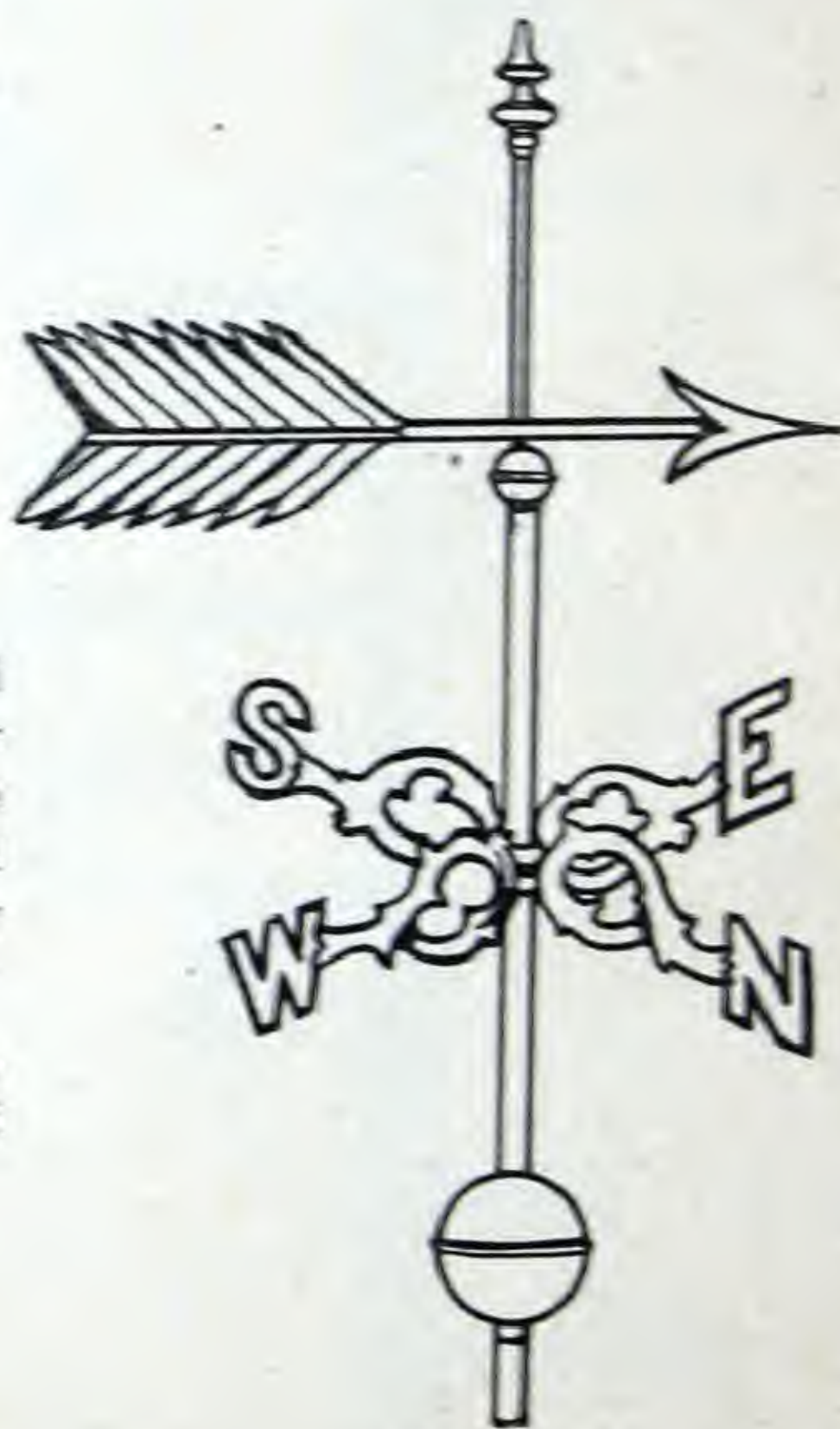


No. 110

Two styles are shown. We will make up any style wanted, either plainer or more ornamental than those shown. Workmanship is first-class and each one is shipped complete ready for erection.

When ordering or asking for prices, state length of vane and height of mast.

If the designs shown are not suitable, send in a rough sketch showing what your ideas are. We will make a drawing and return to you for approval. There are hundreds of designs for weather vanes. The two illustrated here show how they are constructed.

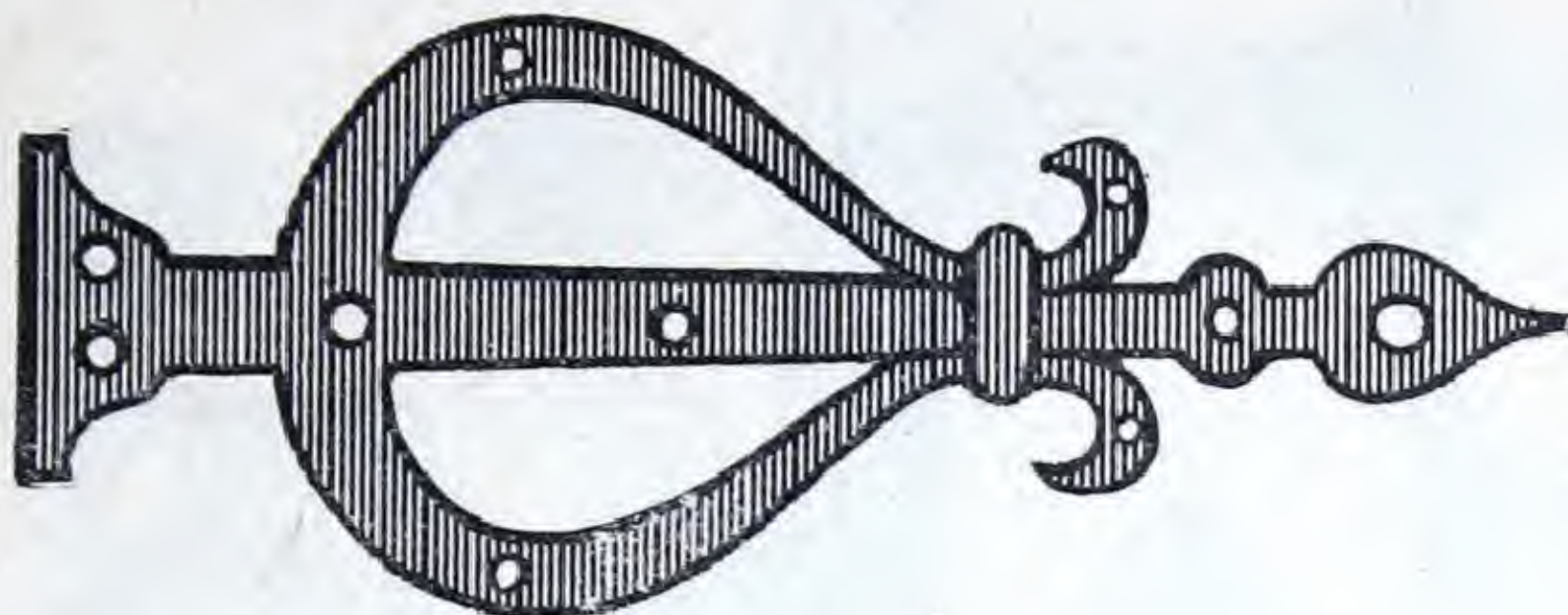


No. 111

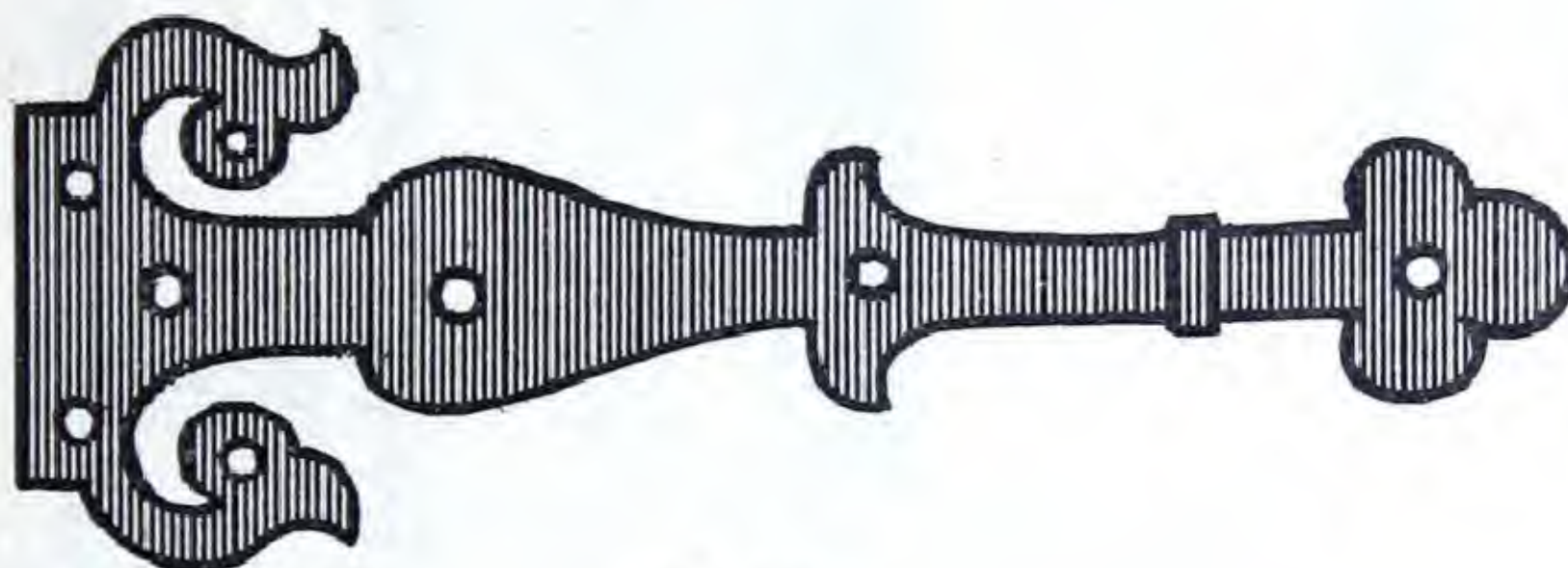
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Ornamental Iron — *Continued*

WROUGHT IRON HINGES



No. 112



No. 113

Nos. 112 and 113 illustrate two styles of ornamental iron hinges for heavy doors. We make these hinges in all patterns. When writing for prices give size of door and length, width and style of hinge wanted.

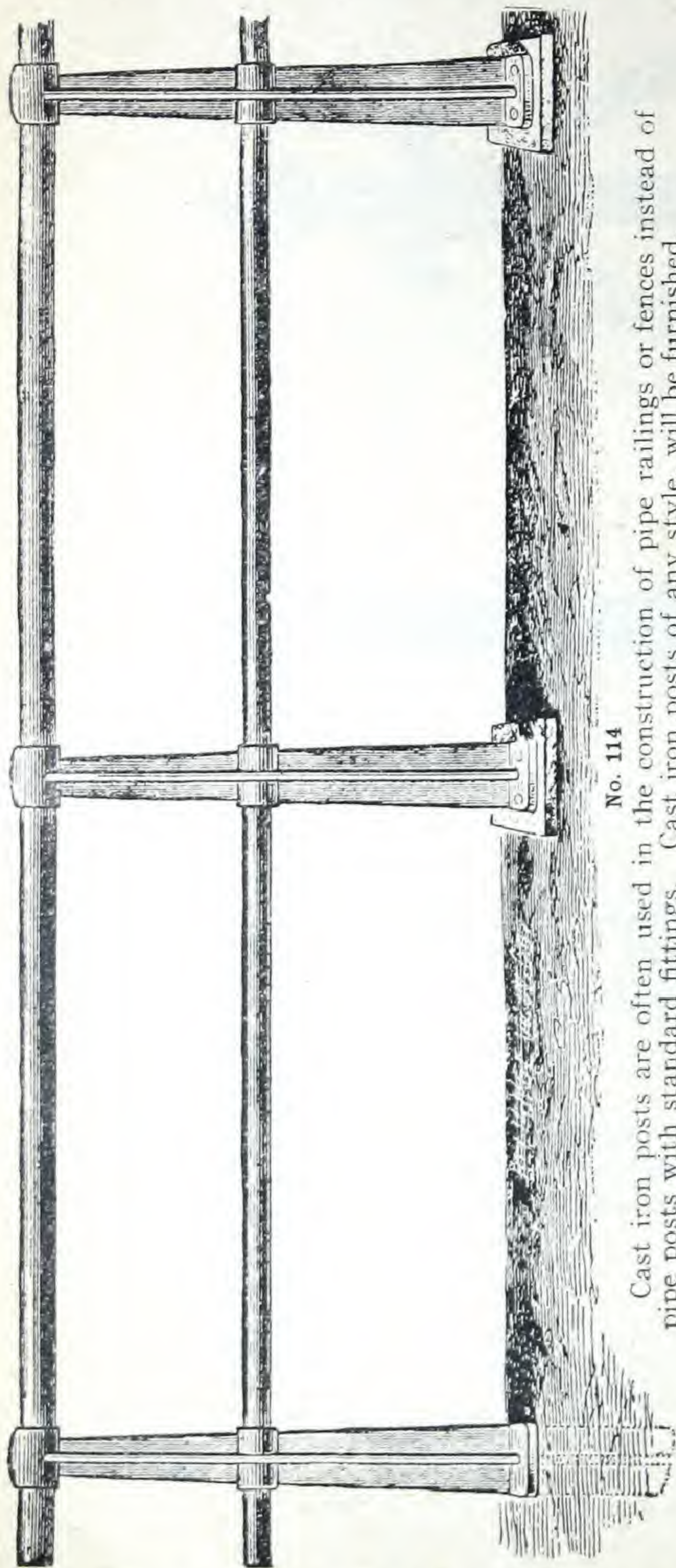
Send sketch showing style wanted if not as illustrated.

These ornamental hinges can be made of cast iron, but would not be as strong as wrought iron.

We have about one hundred designs of ornamental hinges of all sizes and sell a great many of them throughout Western Canada. These hinges are furnished with brass, bronze or any other kind of plating if wanted.

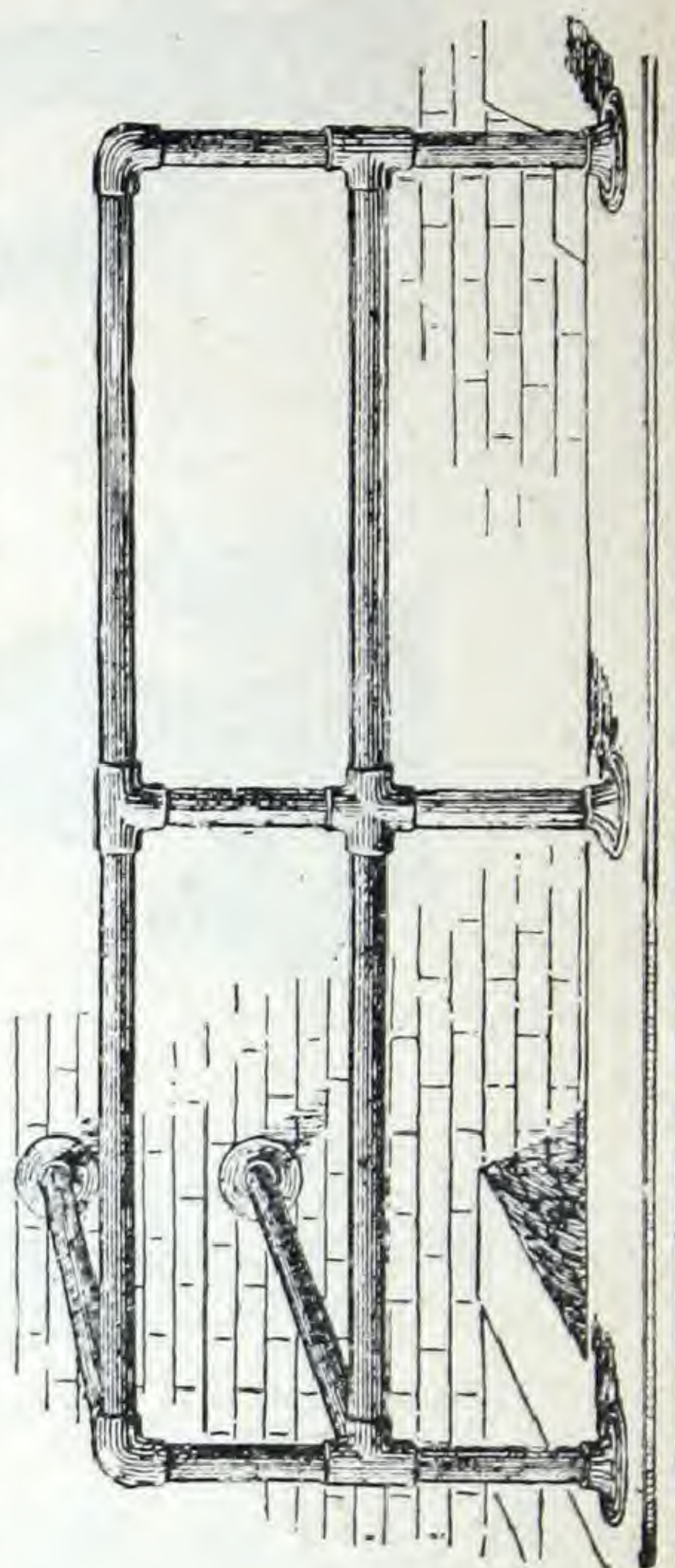
Ornamental Iron—*Continued*

AREA RAILINGS



No. 114

Cast iron posts are often used in the construction of pipe railings or fences instead of pipe posts with standard fittings. Cast iron posts of any style, will be furnished.



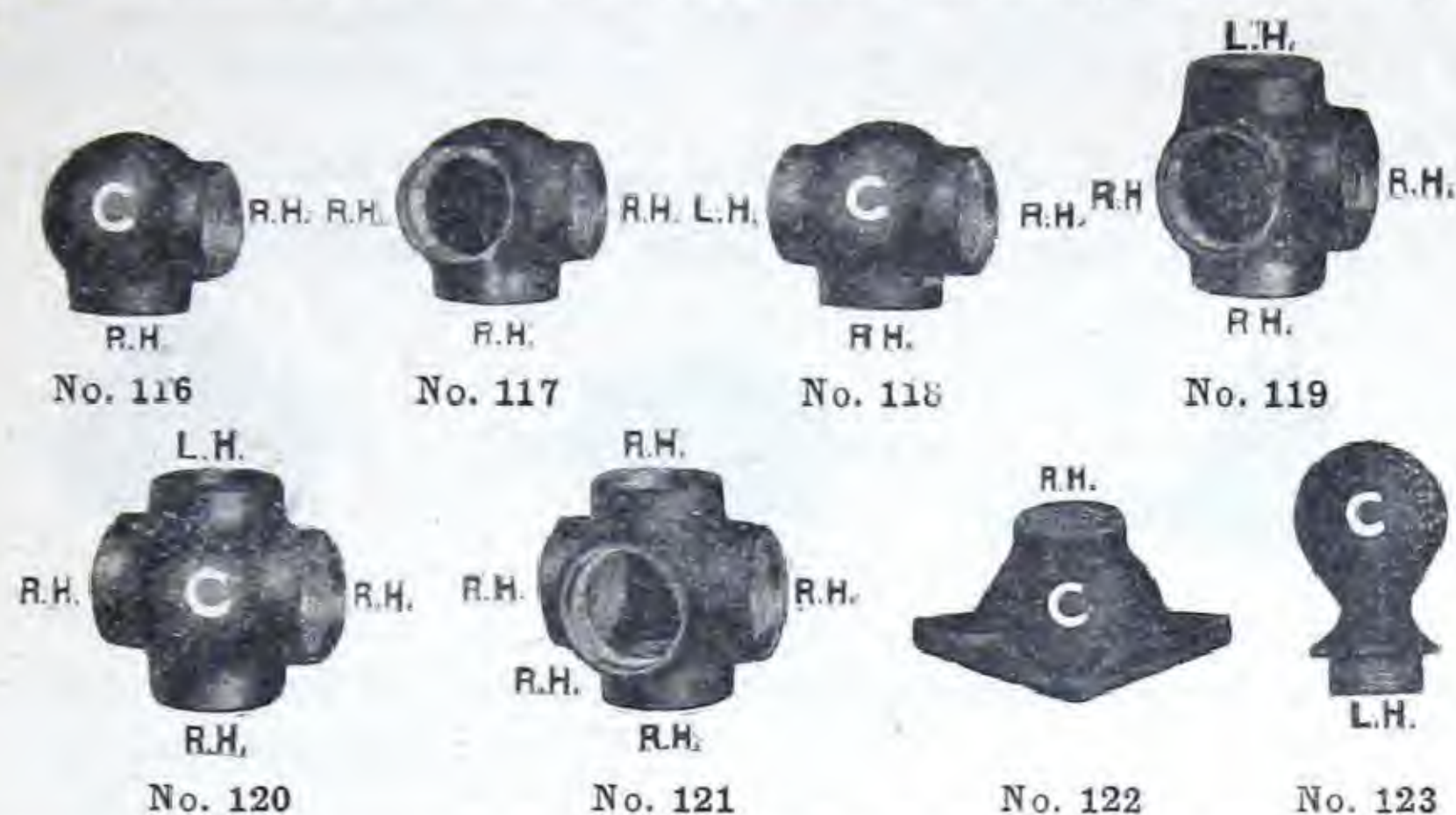
No. 115

Illustration No. 115 shows method of using the malleable iron railing fittings listed on page 76. Flanges, tees, crosses, elbows, floor and wall plates are shown.

Ornamental Iron — *Continued*

RAILING FITTINGS — FINISHED BRASS

For office railing, enclosing engines and machinery, exhibition spaces, etc.



	Pipe size in Inches, and Prices				
	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
No. 116 Elbow, each	\$1.10	\$1.30	\$1.70	\$2.10	\$3.00
No. 117 Elbow, side outlet, each	1.50	1.60	2.20	2.50	3.50
No. 118 Tee, each	1.30	1.75	2.20	2.50	3.50
No. 119 Tee, side outlet, each	1.50	1.75	2.50	2.90	4.00
No. 120 Cross, each	1.75	2.00	2.50	2.90	4.00
No. 121 Cross, side outlet, each,	1.95	2.20	2.75	3.50	4.50
No. 122 Floor Flange, square, each	1.40	1.50	1.85	2.25	3.00
No. 123 Ball Ornament, each	1.40	1.50	1.85	2.25	3.00

Brass Railing Fittings are made to order only. Railing Fittings will be furnished tapped, as shown in cuts, or Right Hand on all openings when so specified, at regular price, tapped otherwise will be charged at 15 per cent. additional, net.

In ordering describe kind wanted by number and size.

MALLEABLE IRON RAILING FITTINGS FOR ALL PURPOSES

See illustrations No. 116 to No. 133, page 79 and 80.

	Pipe size in Inches, and Prices				
	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
No. 116 Elbow, each .....	.38	.40	.55	.65	.92
No. 117 Elbow, side outlet, each .....	.43	.45	.60	.70	1.00
No. 118 Tee, each .....	.43	.45	.60	.70	.95
No. 119 Tee, side outlet, each .....	.53	.55	.65	.75	1.10
No. 120 Cross, each .....	.53	.55	.65	.78	1.20
No. 121 Cross, side outlet, each .....	.58	.60	.70	.85	1.55
No. 122 Floor Flange, square, each .....	.38	.40	.60	.70	1.10
No. 123 Ball Ornament, each .....	.38	.40	.45	.55	1.10

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Ornamental Iron—*Continued*

MALLEABLE IRON RAILING FITTINGS

For Railing Fittings larger than 2-inch, prices on application. Railing Fittings will be furnished tapped, as shown in cuts, or Right Hand on all openings when so specified at regular price. Tapped otherwise will be charged at 15 per cent. additional net. In ordering describe kind wanted by number and size.

Add 50 per cent. to above prices for Galvanized Railing Fittings.

SPECIAL RAILING FITTINGS—MALLEABLE IRON



No. 124



No. 125



No. 126

	Pipe size in Inches, and Prices			
	1	1½	1½	2
No. 124 Floor Flange, Long Base, each .....	.50	.80	.95	1.45
No. 125 45 degrees Side Outlet Elbow, each ...	.70	.90	1.10	1.70
No. 126 45 degrees Side Outlet Tee, each .....	.75	.95	1.20	1.80



No. 127



No. 128



No. 129



No. 130



No. 131



No. 132

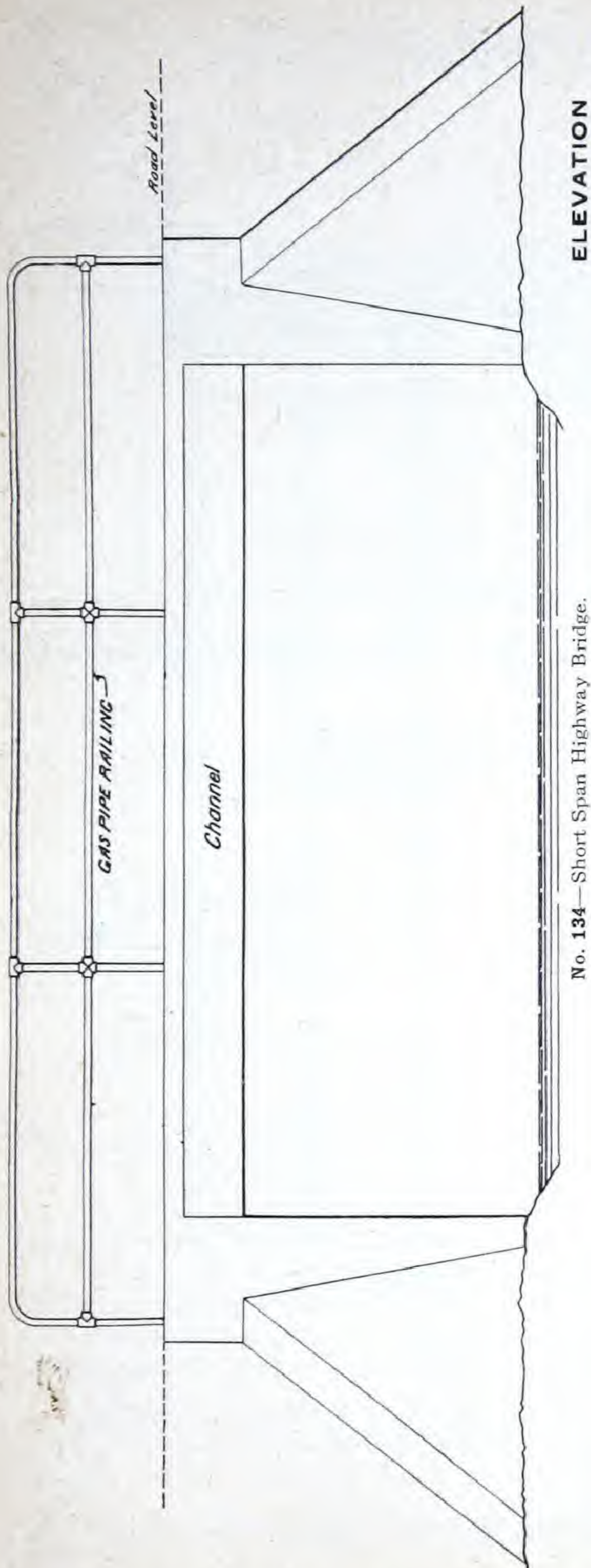


No. 133

	Pipe size in Inches, and Prices			
	1	1½	1½	2
No. 127 Stair Rail Bracket, each .....	.55	.55	.55	.55
No. 128 Stair Rail Bracket Elbow, each		1.20		
No. 129 Loafer Rail (cast iron), 18 in. long, each	.50	.50	.50	.50
No. 130 Hitching Post Caps, Male, each .....			.55	
No. 131 Hitching Post Caps, Female, each .....			.60	
No. 132 Board Walk Flange, each .....				.85
No. 133 Board Walk Bracket, each .....				.85

Add 50 per cent. to above prices for galvanized railing fittings. In ordering these fittings describe kind wanted by number and size of pipe.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216



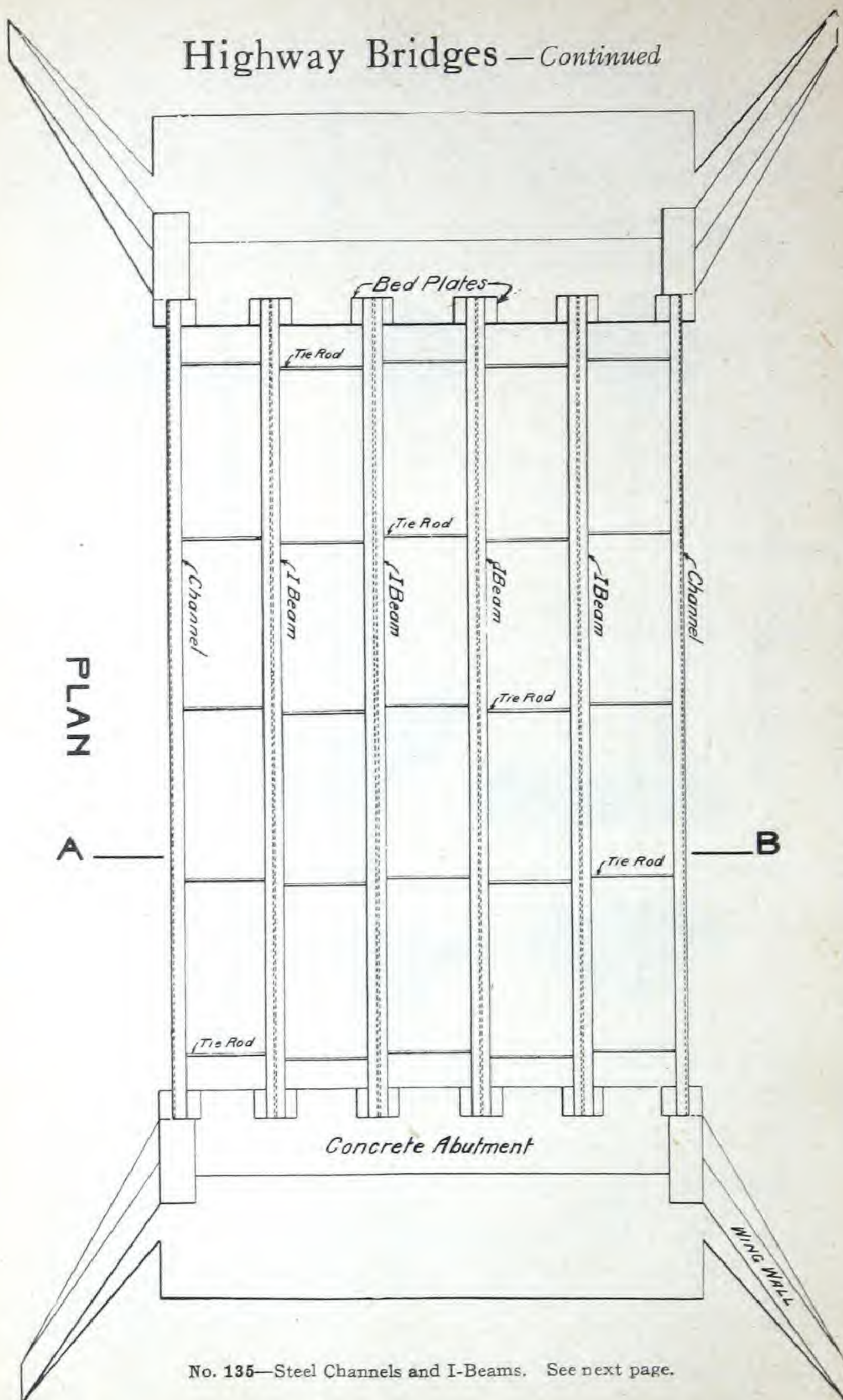
Highway Bridges

STEEL BRIDGE CONSTRUCTION — DESIGNS FOR ALL SPANS

The capacity of our Bridge Shop is 15,000 Tons per year

Designs and estimates of cost for any kind of steel Highway Bridge will be furnished without charge to Municipal Officials or others who may be interested in Bridge construction.

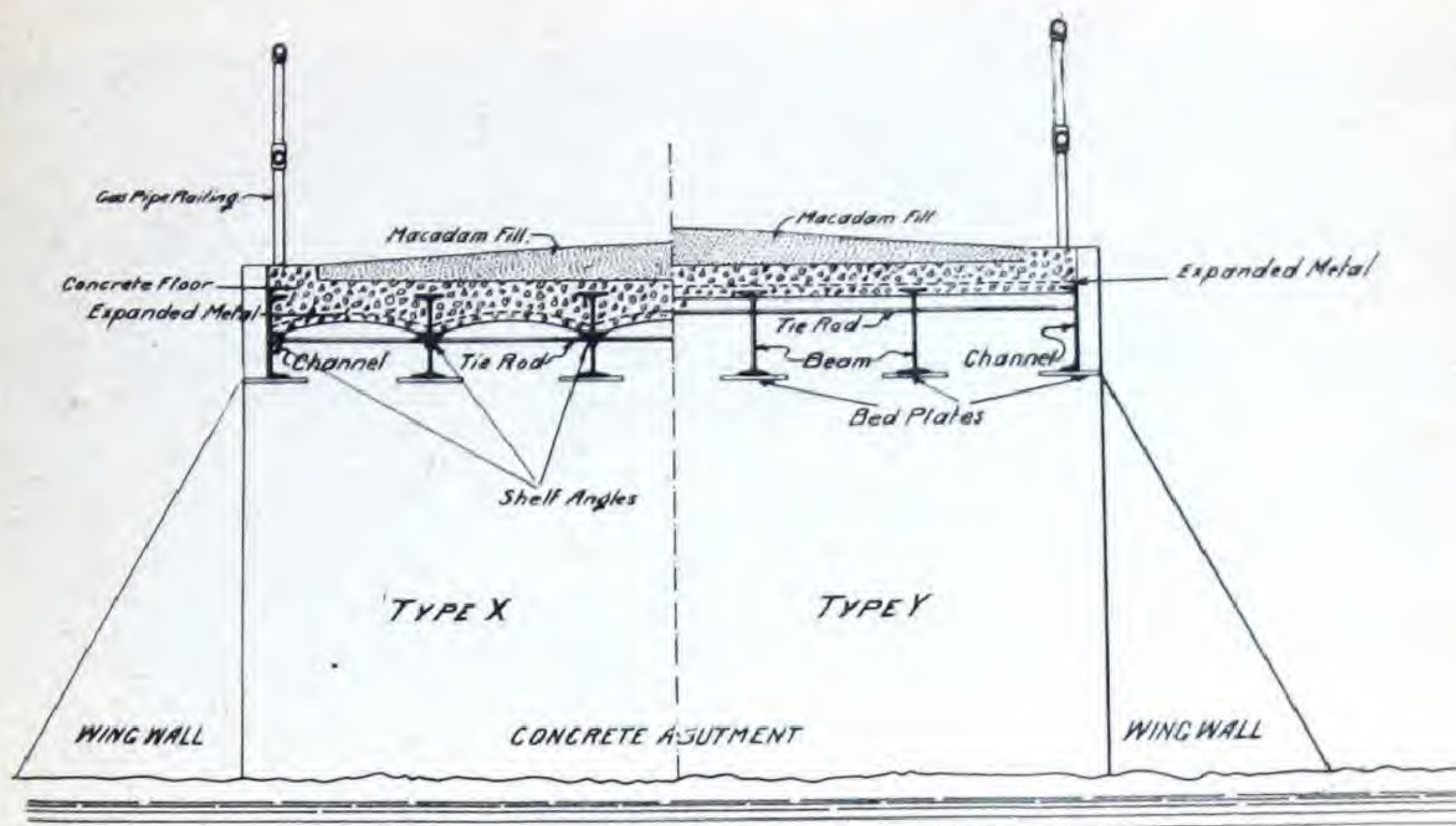
The type of short span Highway Bridge in general use is as illustrated above. This bridge is constructed of steel I-beams and channel girders resting on masonry or concrete abutments, and is suitable for spans not over thirty feet. This construction permits of a large area of headroom or open space underneath the bridge and between the abutments for the passage of water or ice.

Highway Bridges — *Continued*

No. 135—Steel Channels and I-Beams. See next page.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Highway Bridges—Continued



SECTION A.B.

Showing alternative styles of Concreting.

No. 136—Shows concrete floor.

The illustration No. 135 shows the arrangement of the steel channels and I-Beams of which the Bridge is constructed. The ends of all the beams rest on steel bearing plates which distribute the load properly on the seat of the abutment. The beams are spaced and held securely in position by the iron tie rods shown.

For permanent construction it is advisable to have a concrete floor. There are two ways of constructing this floor as illustrated above, No. 136.

In Type "X" steel shelf angles are riveted to the beams and these angles carry the concrete arches just above the tie rods, as shown. The concrete is re-inforced with expanded metal.

In Type "Y" a flat concrete floor slab re-inforced with expanded metal as shown, is used, and no steel angles are required. Either of the designs are suitable and the floor will safely carry the heaviest Traction Engine or Threshing Outfit in existence. A wooden floor can be constructed instead of concrete but it would not be so durable nor as strong.

These I-Beam Girder Bridges are easily erected and are not expensive. A large number are in use in Canada and the United States.

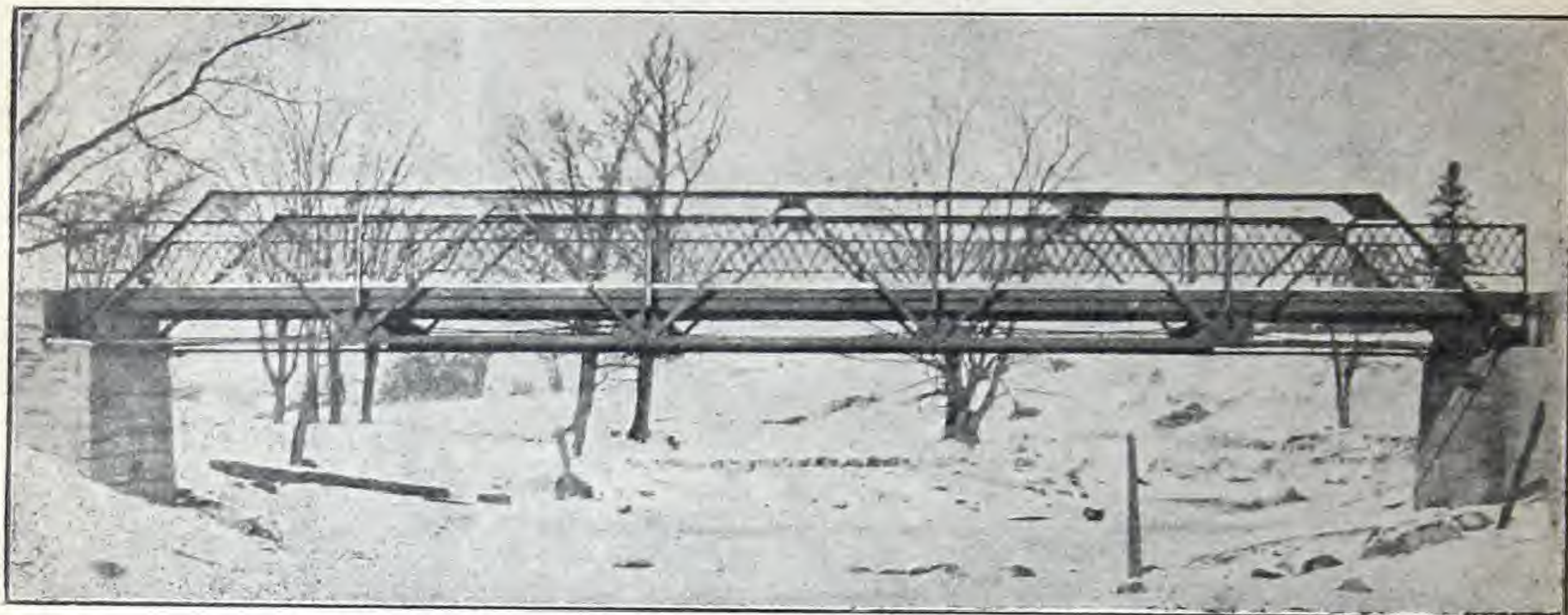
This design is made up in accordance with Dominion Government specifications covering Highway Bridges.

State width and length of span and we will tell you what the cost will be.

When the span or distance between abutments is made more than 40 feet Truss or Plate Girder Bridges are used. See next page.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Highway Bridges — *Continued*



No. 137—Steel Highway Bridge —Low Truss Type.

Truss Bridges may be either "Low" or "High," depending on the span. Illustration No. 137 shows a "Low" Truss Bridge of 60 feet span, having a wooden floor system. This type is known as a through, pony "Warren" riveted truss and is in very general use where the span is not more than 60 or 70 feet. When the span is more than 70 feet a "High" Truss of either Warren, Pratt or Howe design, pin connected, is more desirable. All Bridges which we construct are designed in accordance with Government specifications and will safely carry the heaviest machinery likely to cross them. The usual width of Highway Bridges is 16 feet in the clear, but they can be made of any desired width.

If you are considering the construction of any kind of Highway Bridge it will pay you to write us for designs and estimates. State the length and width of bridge required and your communication will have prompt and careful attention.

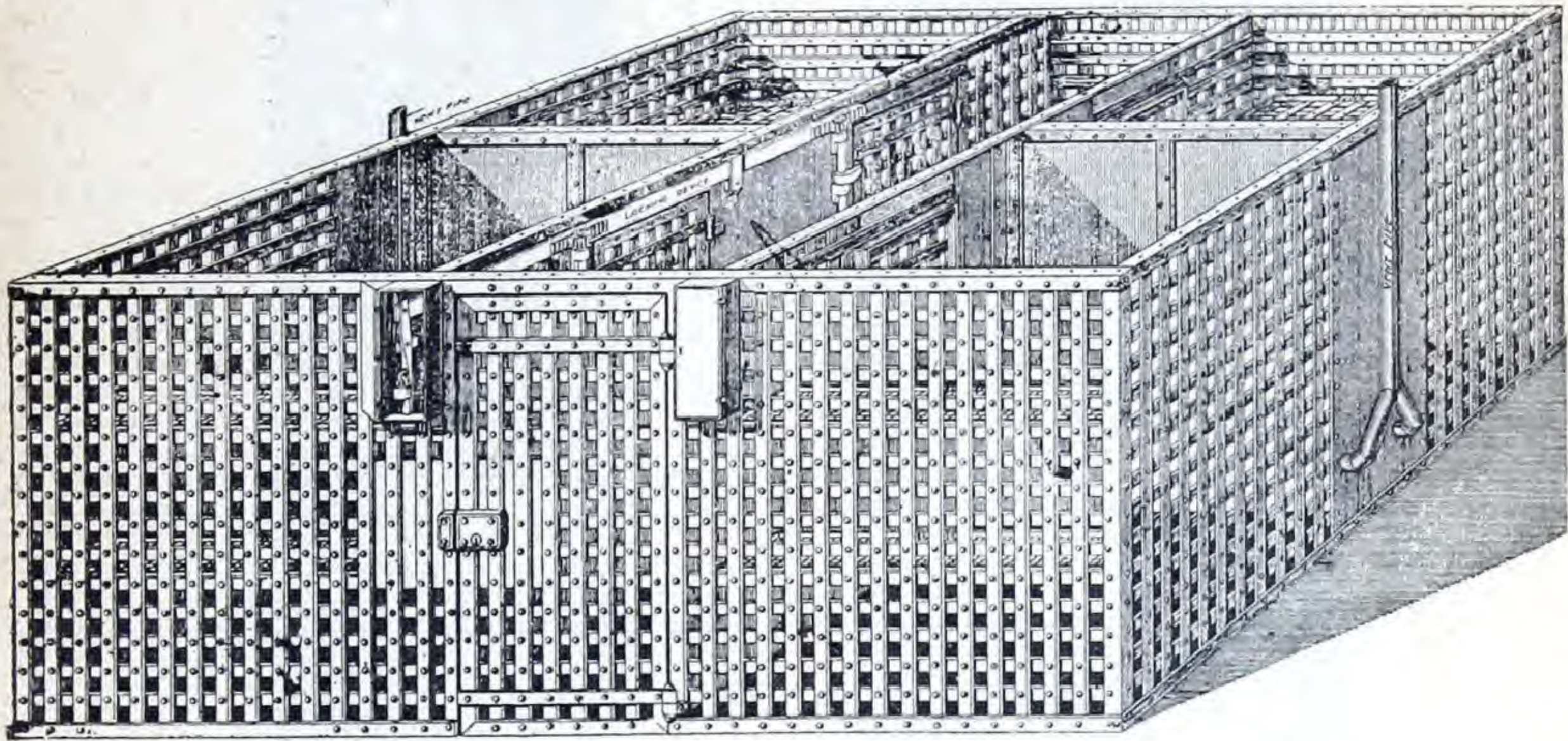
There are so many different types of Bridges used that it would require a lot of space to illustrate them all. We will submit a design at any time for a Bridge of the type most suitable to the location and length of span required.

Besides Steel Truss Bridges, we also furnish all iron work for Timber Bridges, including rods, bolts, castings, etc. We will quote a lump sum price for iron work of this kind for any Bridge under consideration anywhere in Western Canada.

Send blue prints or schedule, for prices.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Jail Equipment



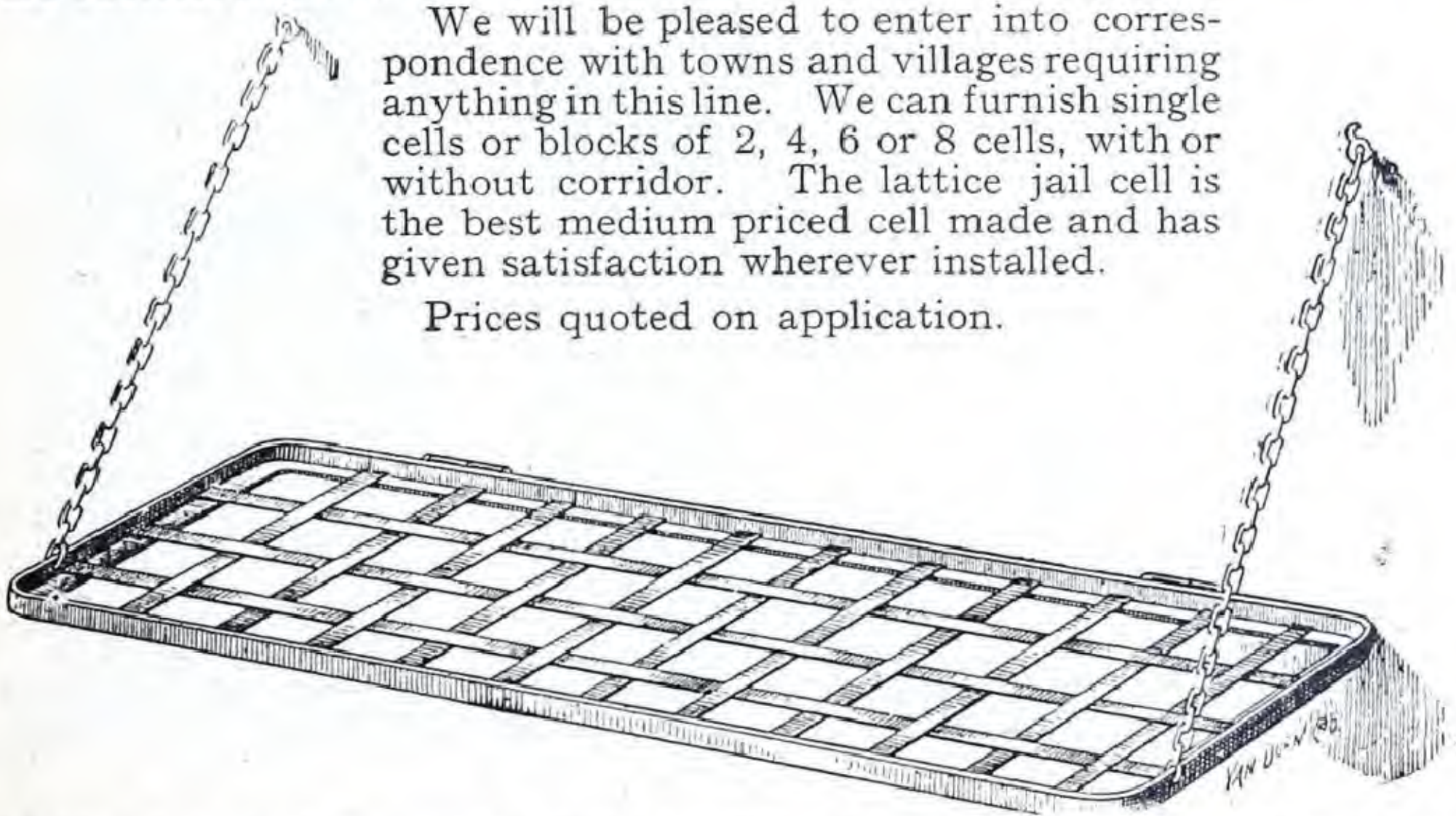
No. 138—Steel Lattice Jail Cells.

Above illustration shows a block of 4 steel lattice cells with corridor. These cells are usually made of $1\frac{1}{2} \times \frac{1}{4}$ inch or $1\frac{1}{2} \times \frac{3}{16}$ inch steel bars, with spaces about $4\frac{1}{2}$ inches square, securely riveted with heavy rivets at all intersections. The frames are formed of $1\frac{3}{4} \times 1\frac{3}{4} \times \frac{3}{16}$ inch steel angles.

Roof can be lattice work same as front, and sides of solid steel plate. Can be made with steel plate floor if desired or to attach to cement or wood floor. Partitions between cells are usually of steel plate, lattice work facing corridor. Doors are fitted with improved locks, which afford ample security. All parts are fitted together complete at works before shipment and marked so that any ordinary mechanic can set up the cells without trouble. Each cell can be provided with swinging steel bunk. See No. 139, page 85, and odorless night soil bucket.

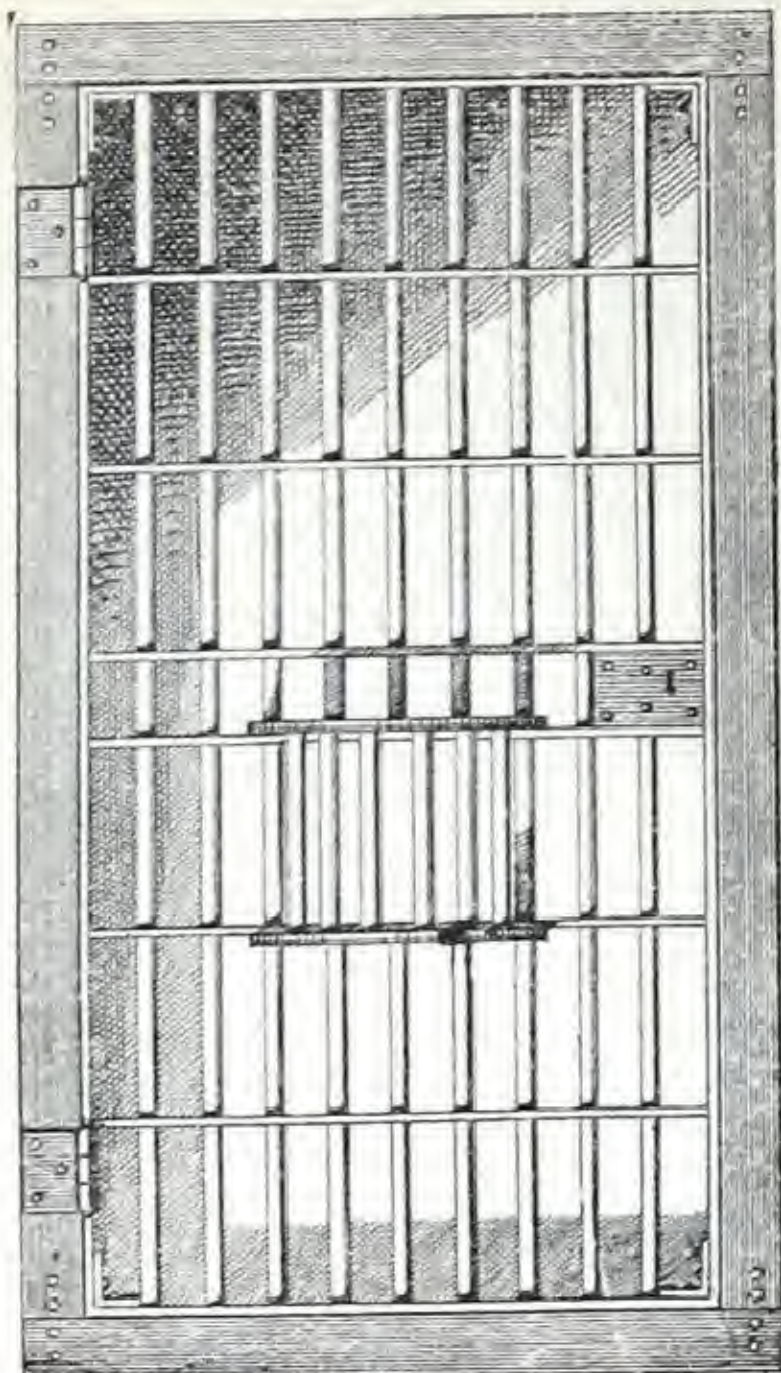
We will be pleased to enter into correspondence with towns and villages requiring anything in this line. We can furnish single cells or blocks of 2, 4, 6 or 8 cells, with or without corridor. The lattice jail cell is the best medium priced cell made and has given satisfaction wherever installed.

Prices quoted on application.

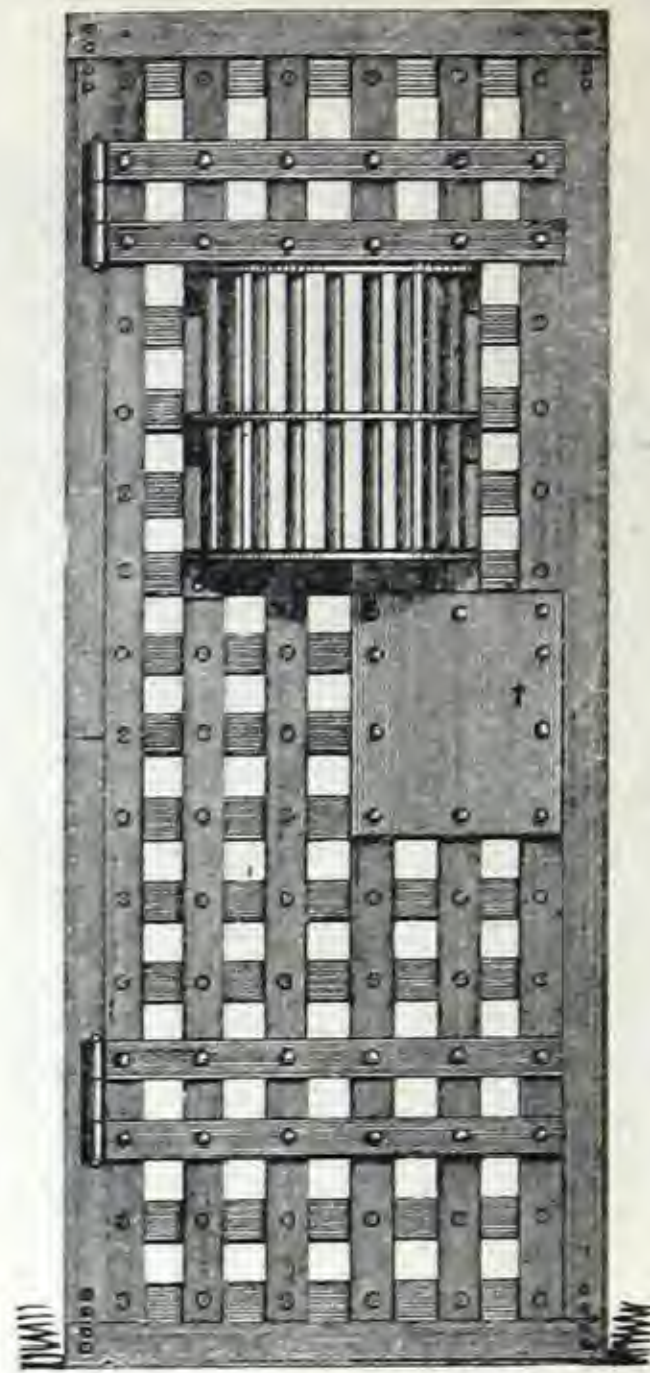


No. 139—Swinging lattice steel Bunk for Jail cells. Prices on application; state size wanted.

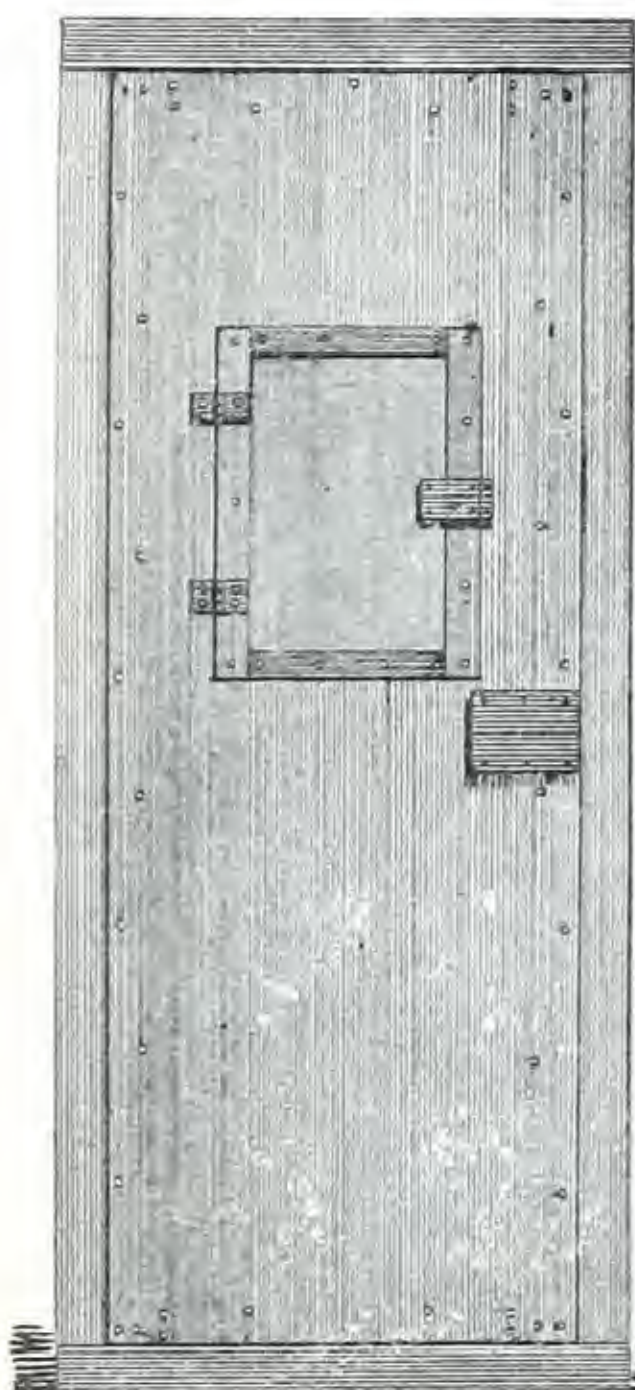
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Jail Equipment — *Continued*

No. 140—Steel bar Jail Door. Round steel vertical bars 1-inch diameter, horizontal bars 2x $\frac{1}{8}$ -in. Frame 2x $\frac{1}{4}$ -in. steel. Outside frame heavy steel angle; forged hinges; heavy lock. This style of door can be made to fit any size of opening.



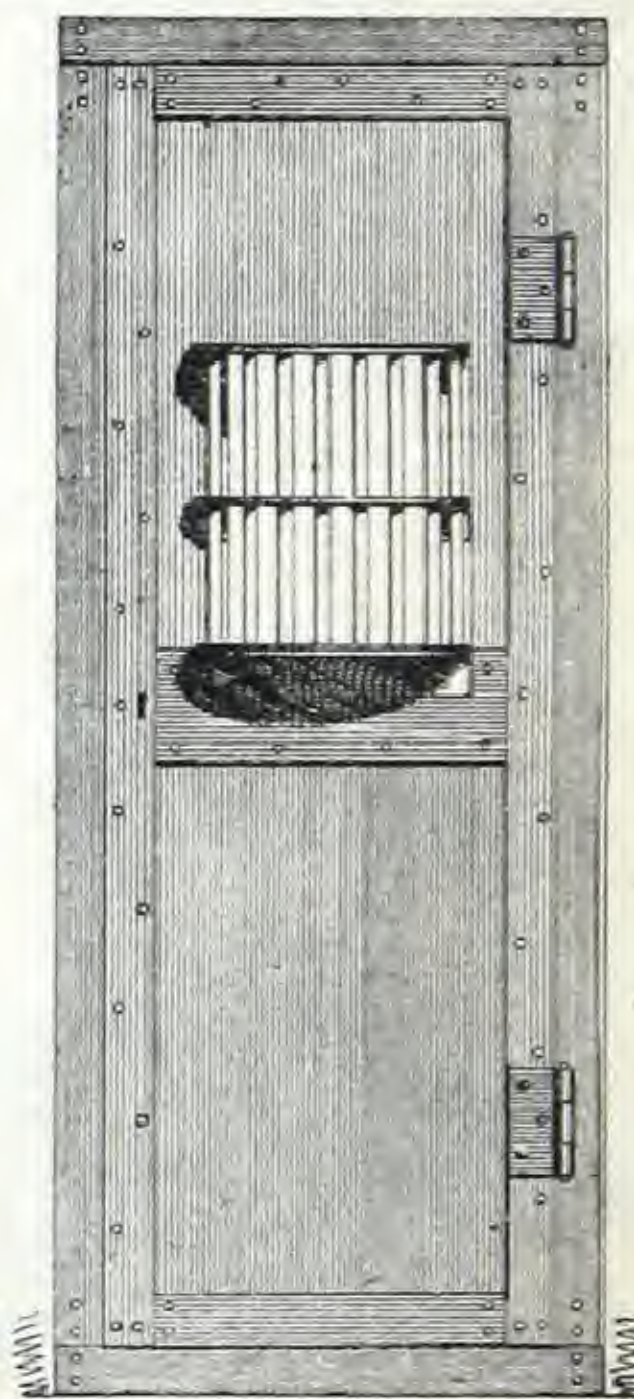
No. 141—Heavy lattice steel Jail Door. Steel bars 1 $\frac{1}{2}$ x $\frac{3}{16}$ -in. Open space about 4 $\frac{1}{2}$ ins. square; 2x2x $\frac{1}{4}$ -in. angle steel frames into which lattice is riveted. Forged hinges, steel armor plate around lock as shown; separate angle frame all around, usually wider and heavier than frame to lattice work of door.



No. 142



No. 143



No. 144

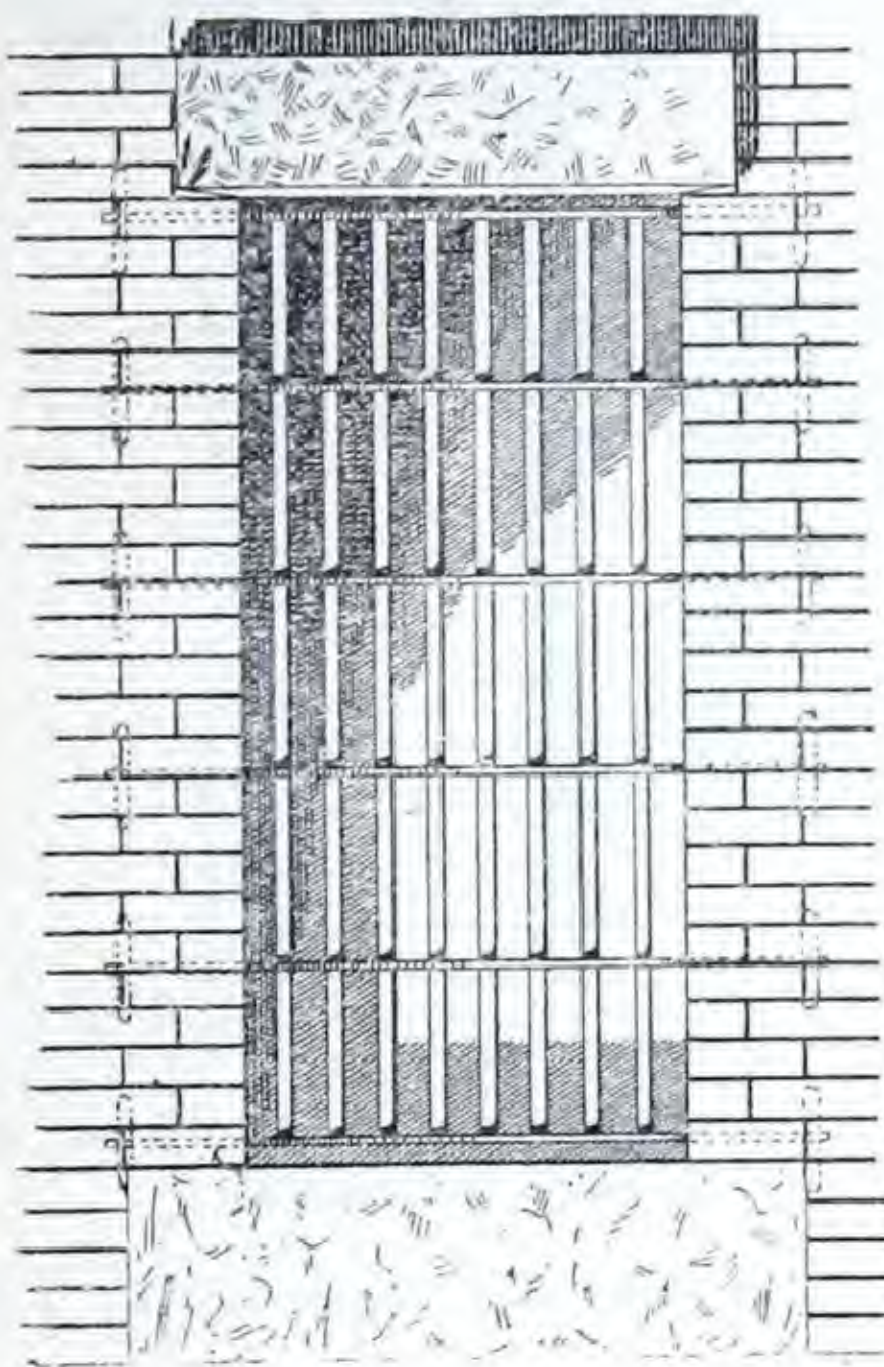
Heavy Steel Plate Jail Doors, made to fit any size of opening. Usually made of $\frac{3}{8}$ inch or $\frac{1}{2}$ inch steel plate securely riveted to 2x2x $\frac{1}{4}$ in. steel angle

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

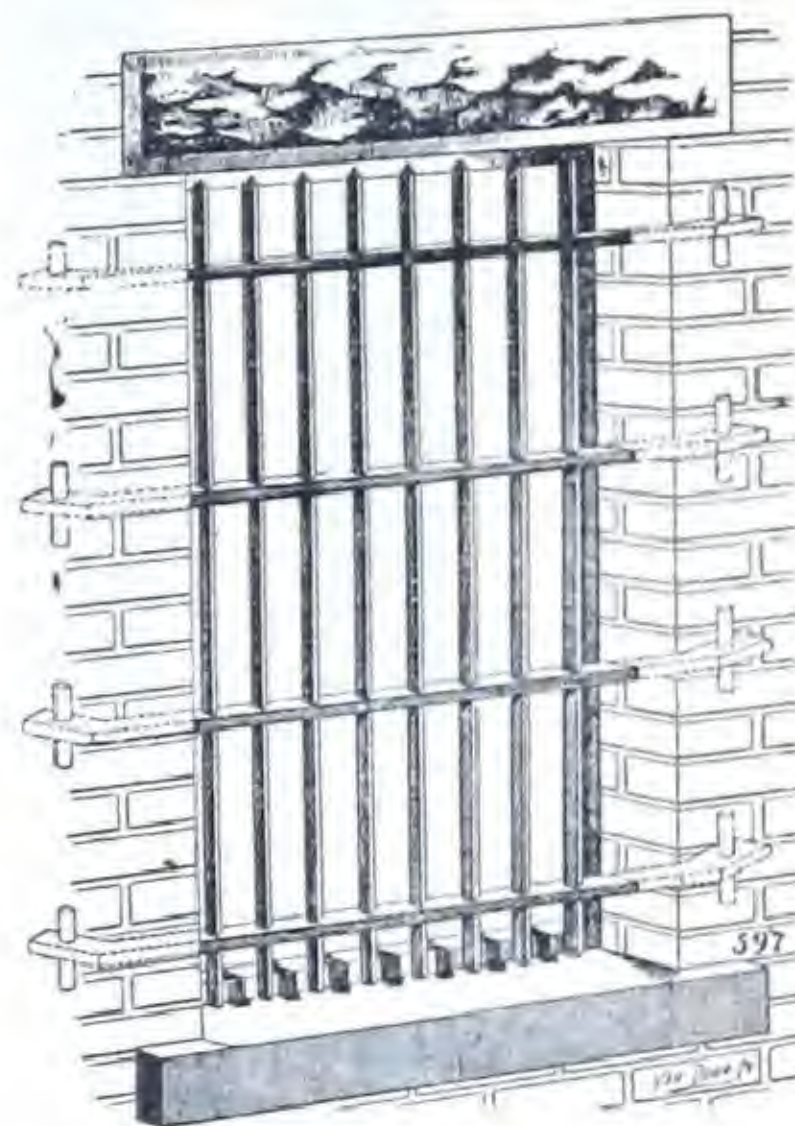
Jail Equipment — *Continued*

frame, extra heavy, forged hinges, separate steel angle frame all around, usually wider and heavier than frame of door.

These illustrations show the style of doors generally used for entrance to cell room or jail building. They can be made heavier or lighter than shown as occasion demands. Steel plate doors can be fitted with observation grating as shown at No. 144, so jailor can see what is going on without opening doors. Correspondence solicited from Municipal officers and others interested in jail and cell fittings.



No. 145 — Steel window Guard for jail. Round steel vertical bars set in heavy horizontal steel bars built securely into wall.



No. 146 — Steel window Guard. Square steel vertical bars set in heavy horizontal bars securely built into wall and anchored.

The window guards illustrated above can be made to fit openings of any size. When ordering give width and height of each clear opening. Prices on application.

Stable Fittings



No. 147—Stall Posts.



No. 148—Stall Post with flat side.

These posts are made 5-in. or 6-in. in diameter and from 4 to 6 feet high all with flanges on rear side for receiving 2-inch wood partitions.

Prices \$9.00 to \$12.00 each.

When ordering state height of post and diameter wanted, also height of partition. Write for Discounts.



No. 149



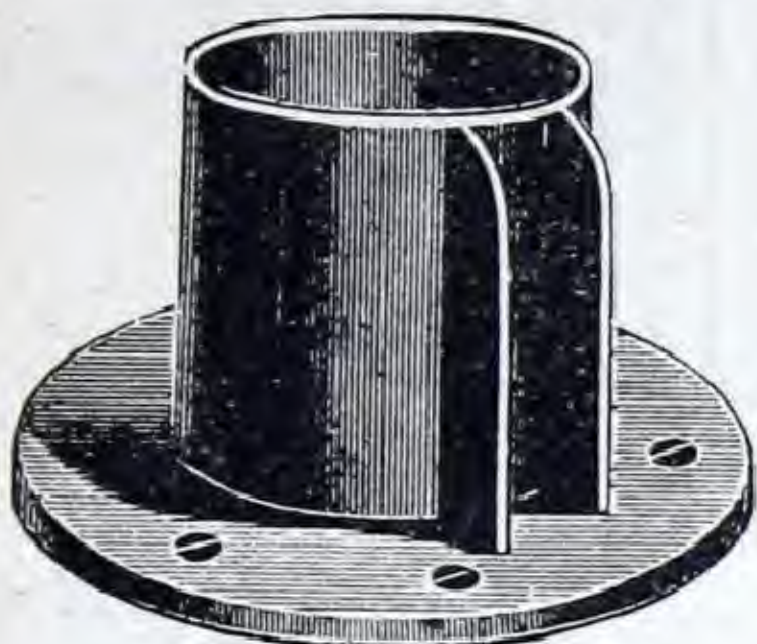
No. 150

Metal Caps for wooden stall posts 5 to 6 inches in diameter. These caps are made of iron, bronze or brass. Prices on application. State diameter of post and whether round or square.

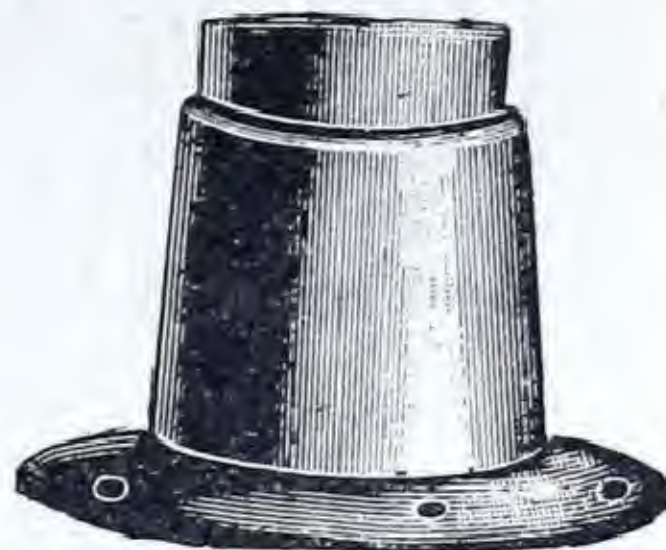
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Stable Fittings — *Continued*

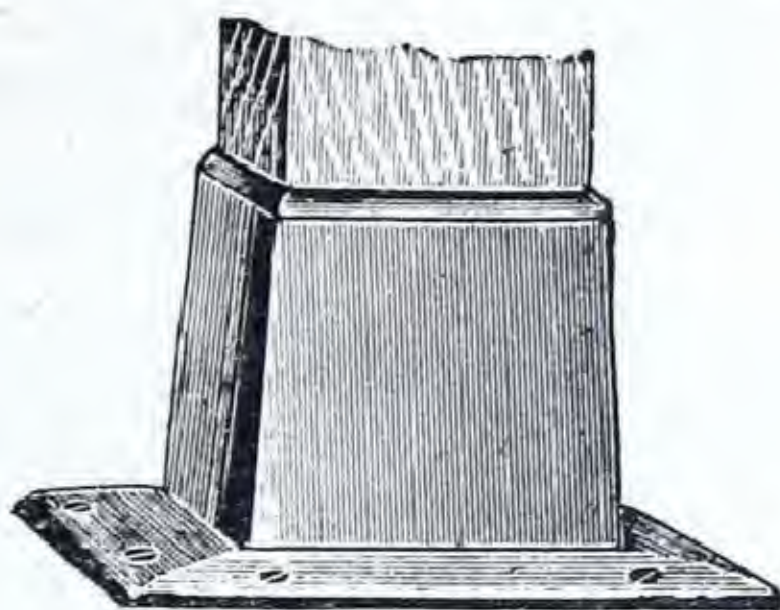
Post Sockets for wood posts Nos. 151, 152, 153, round or square, any size.
Prices on application. State size of post.



No. 151

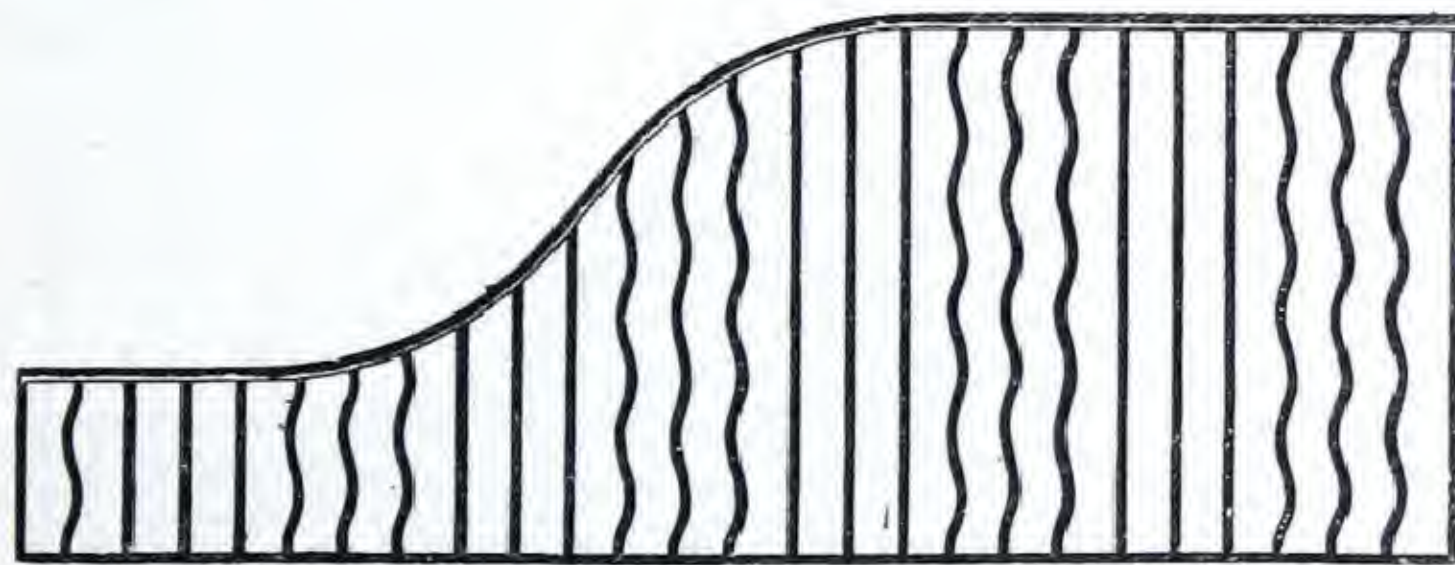


No. 152



No. 153

Wrought Iron Stall Guard, Nos. 154, 155, usual construction, $\frac{1}{2}$ -inch square uprights set 4 inches apart, $1\frac{1}{4} \times \frac{1}{2}$ inch channel frame, oval iron covering bar on top.



No. 154

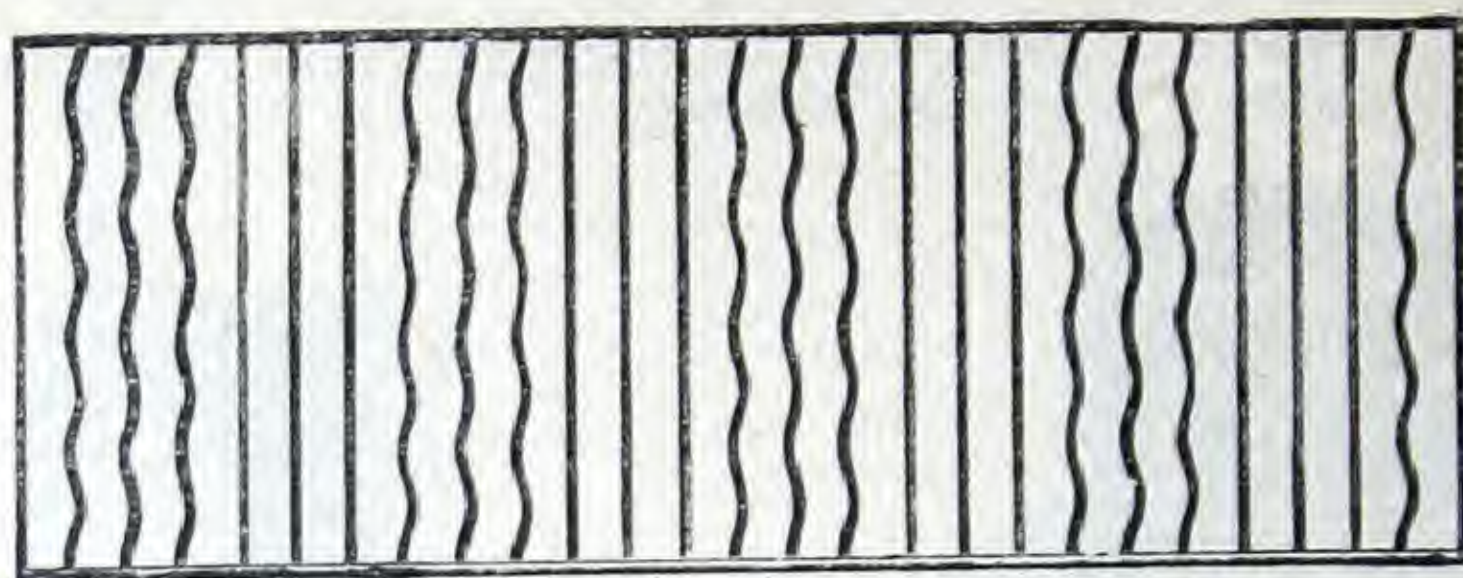
PRICES

6 ft. long, 28 in. high	.....	Each	\$8.00
7 ft. long, 28 in. high	.....	"	8.50
8 ft. long, 28 in. high	.....	"	9.00
9 ft. long, 28 in. high	.....	"	9.50

If uprights are round bars instead of square, deduct \$1.00 from each list price.

Box stall grille work to match 50c. per square foot, made up of $\frac{1}{2}$ inch square uprights set 7 inches apart. $1\frac{1}{4} \times \frac{1}{2}$ inch channel frame, half oval iron covering bar on top.

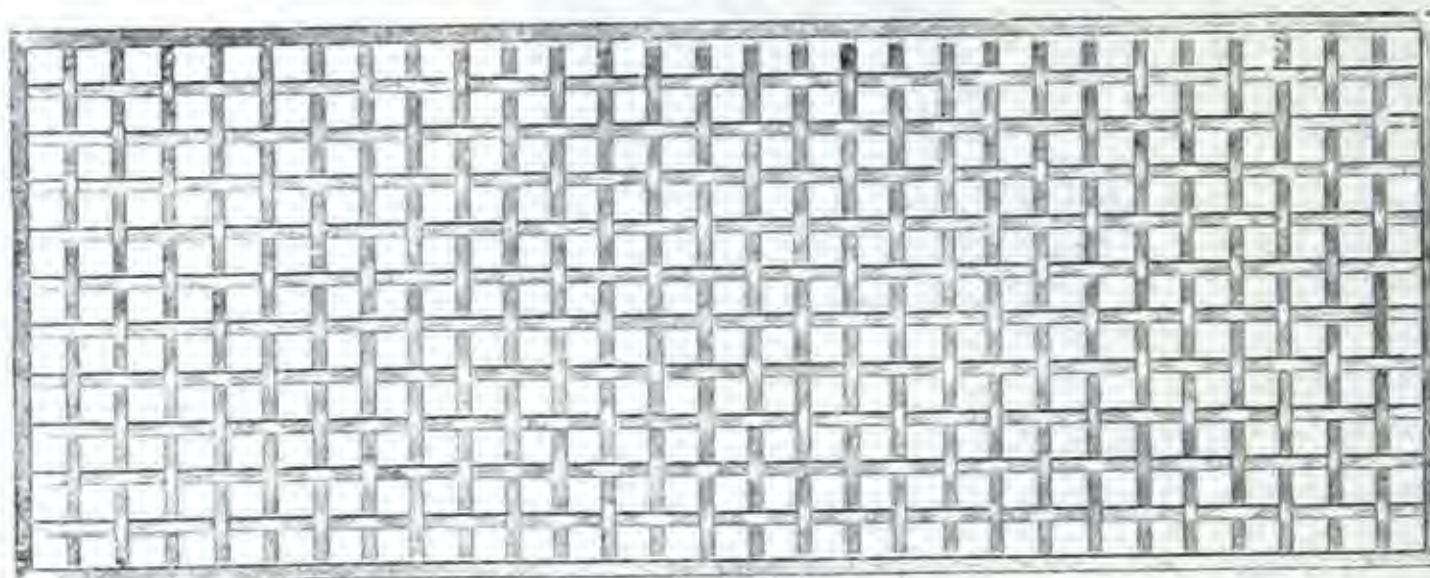
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Stable Fittings—*Continued*No. 155
PRICES

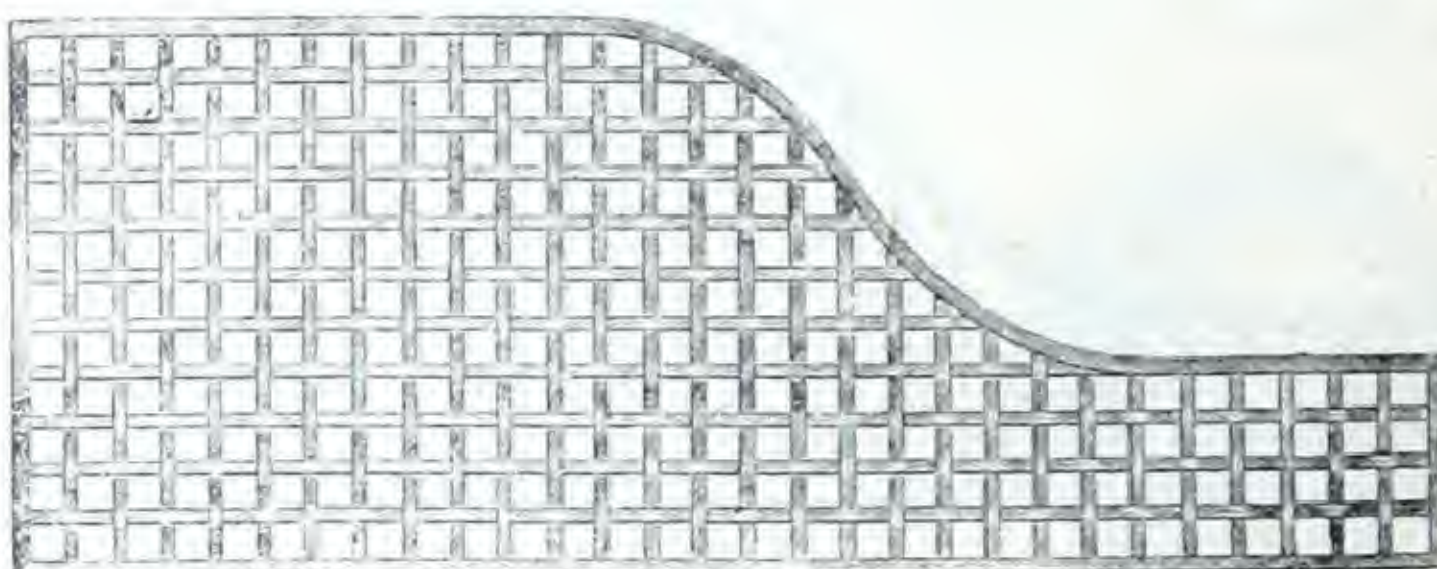
6 ft. long, 28 in. high	.....	Each	\$ 9.50
7 ft. long, 28 in. high	.....	"	10.00
8 ft. long, 28 in. high	.....	"	10.50
9 ft. long, 28 in. high	.....	"	11.00

If uprights are round bars instead of square deduct \$1.00 from each list price.

Box stall grill work to match 50c. per square foot.



No. 156



No. 157

Wrought Iron Stall Guards, see Nos. 156 and 157, made of lattice bars or heavy wire, channel iron frames, half oval iron covering bar on top. Prices 75c. per square foot for lattice, and 50c. per square foot for wire. Write giving size and style wanted. Discounts on application.

Besides the stall posts, post caps, sockets, stall guards, etc., illustrated above, we manufacture other equipment for stables such as mangers, hay racks, cesspools, gutters, wheel guards, heavy wrought iron hinges, watering troughs, harness racks, blanket brackets, slide poles, etc., etc. Send a list describing what you want and giving sizes. Prices will be promptly quoted.

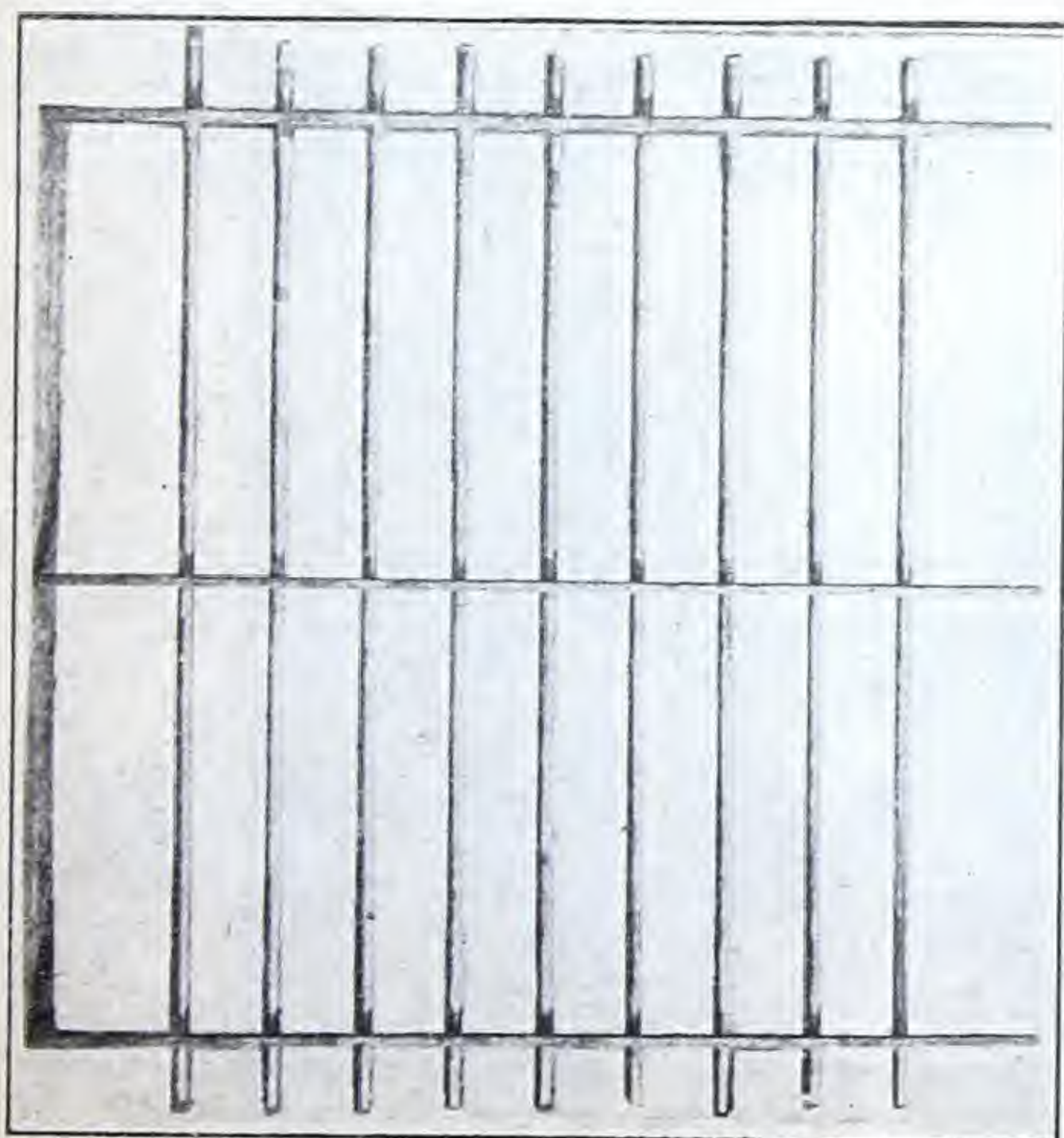
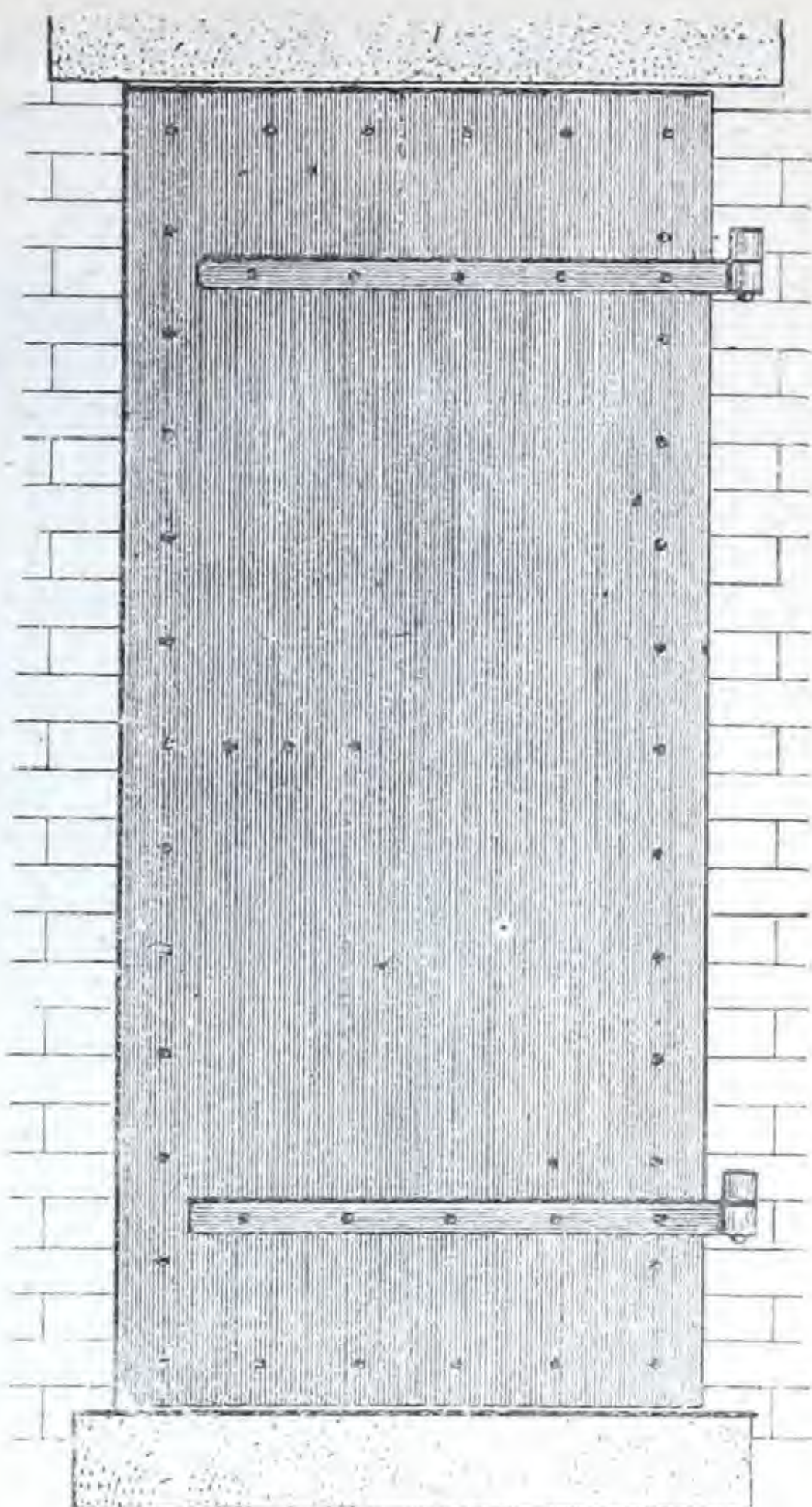
Steel Doors, Fire Shutters, Window Guards

No. 158—Steel Door.

Steel Doors, Window Guards and Fire Shutters, any size or style, made to order. All work is riveted and well finished.

When ordering or asking for prices, give all dimensions and thickness of plate; also state if locking bars are wanted.

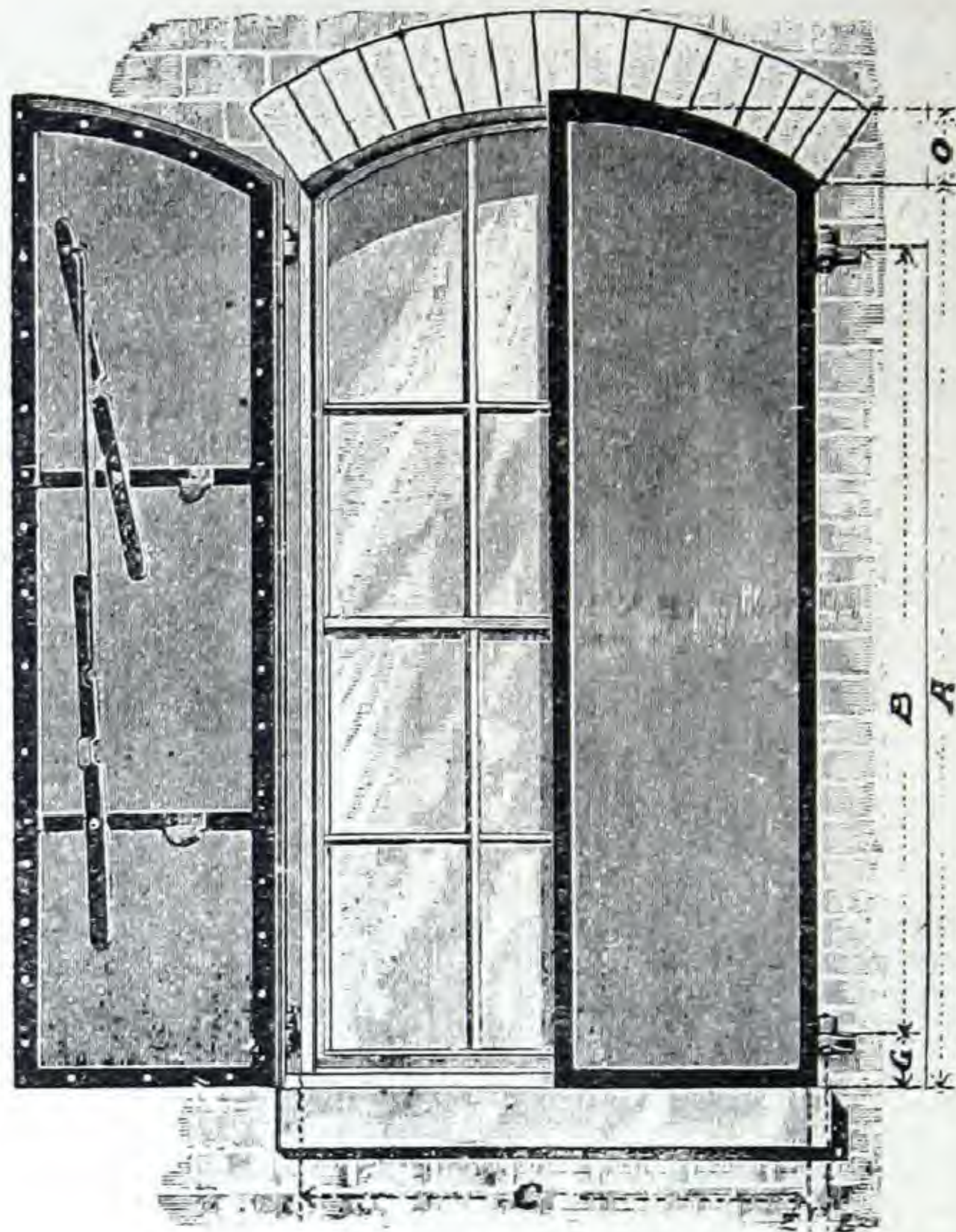
Prices on application.



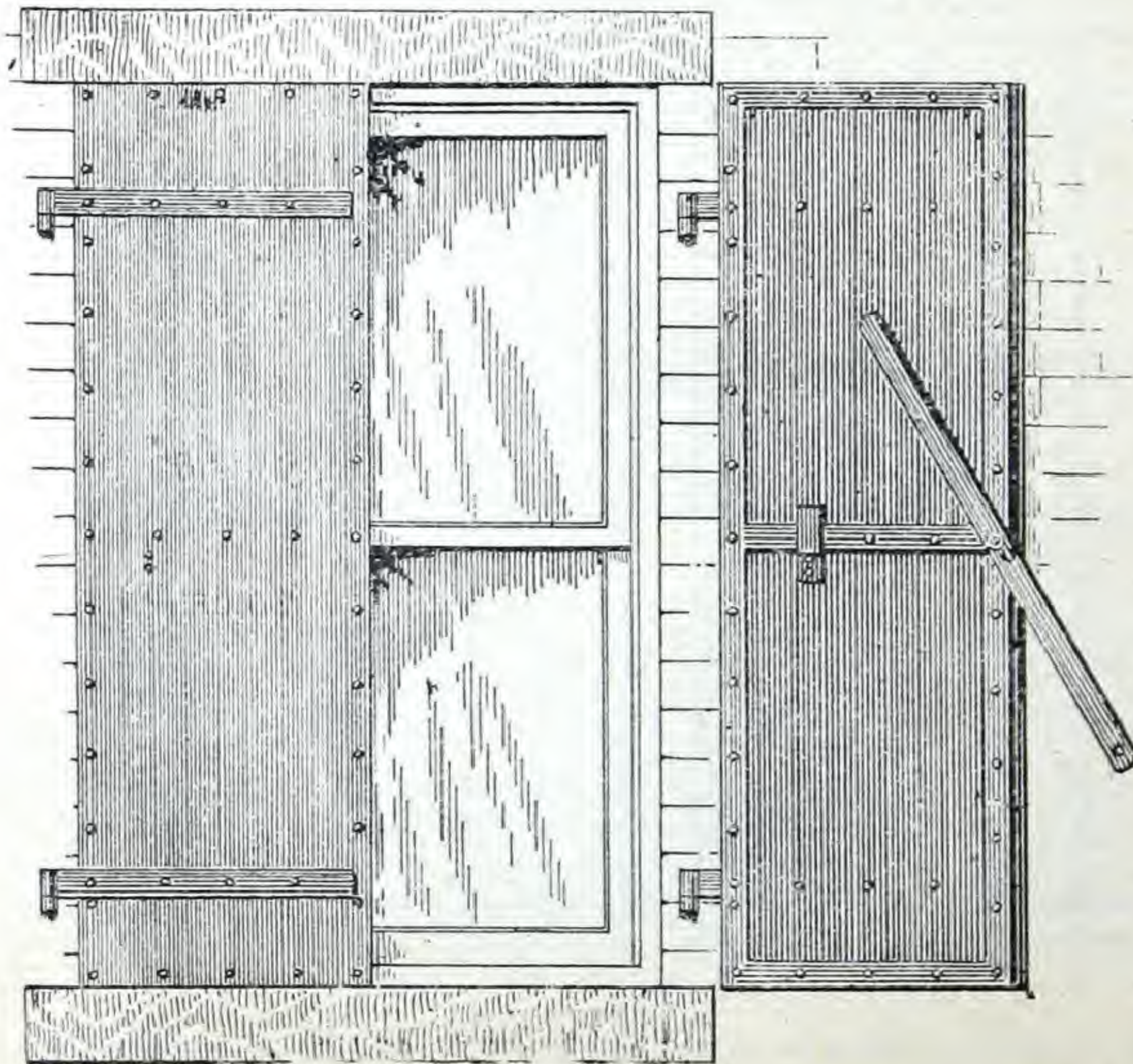
No. 159—Steel Window Guard
Vertical Bars 1 in. diameter.
Horizontal Bars 2-in. x $\frac{1}{2}$ -in

Steel Doors, Fire Shutters, Window Guards

Continued



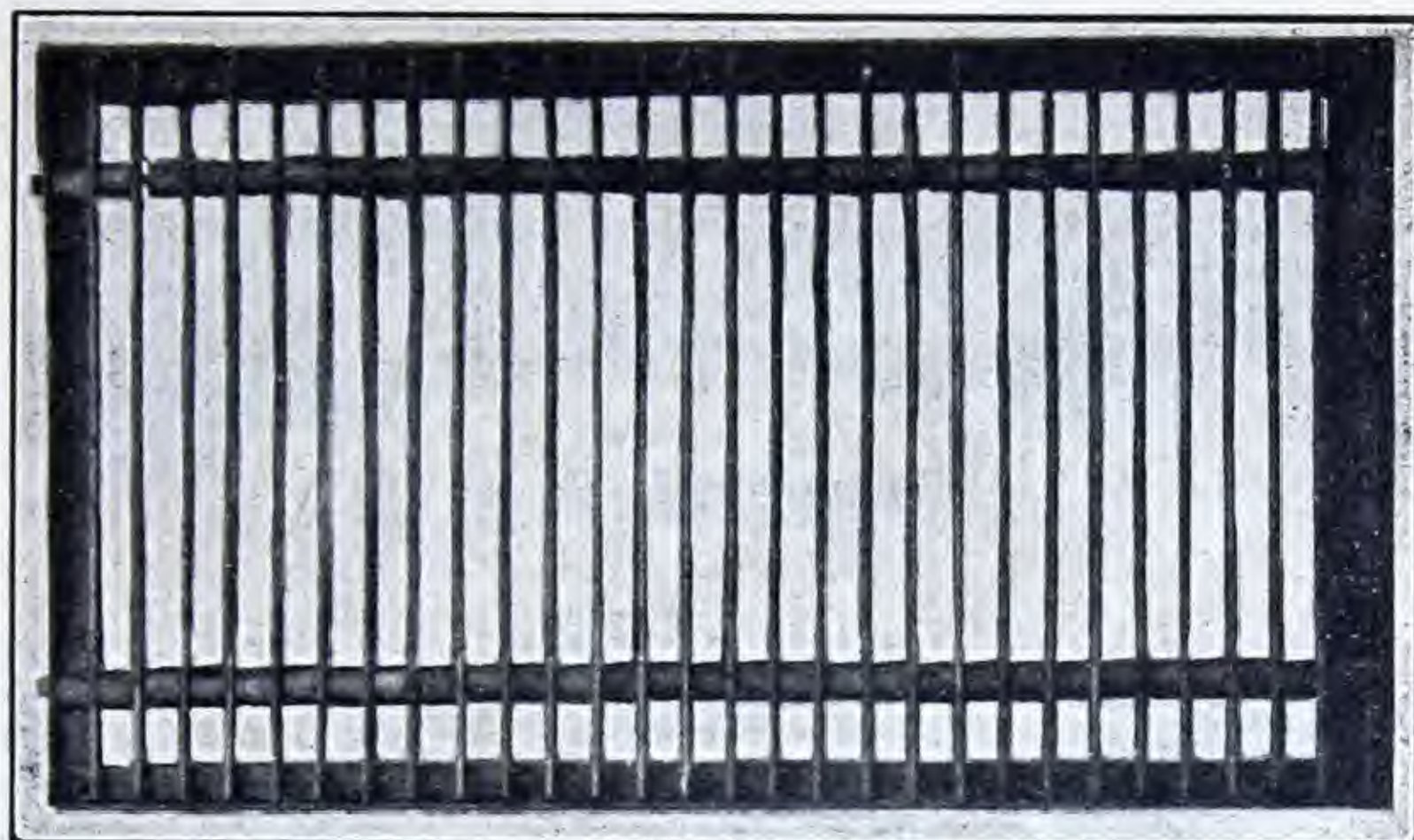
No. 160—Steel Fire Shutters.



No. 161—Steel Fire Shutters.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Area Gratings and Sidewalk Doors



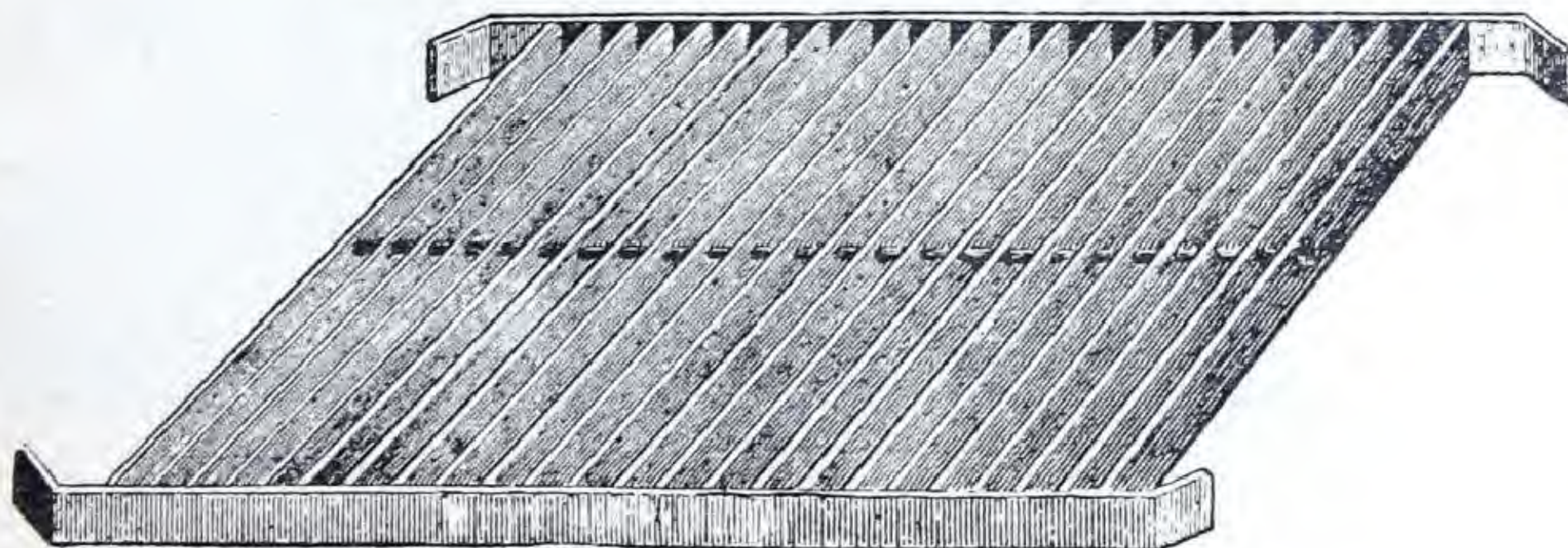
No. 162—Standard Area Grating.

Our Standard side-walk area grating illustrated by No. 162, page 93, is made up of steel angle frame riveted at corners, flat bars on edge, spaces $1\frac{1}{2}$ in. on centers with cast iron separators on $\frac{3}{8}$ in. round iron rods or bolts. Two of these rods are furnished when grating is three feet or less in width, and when over three feet wide three or more bolts are used.

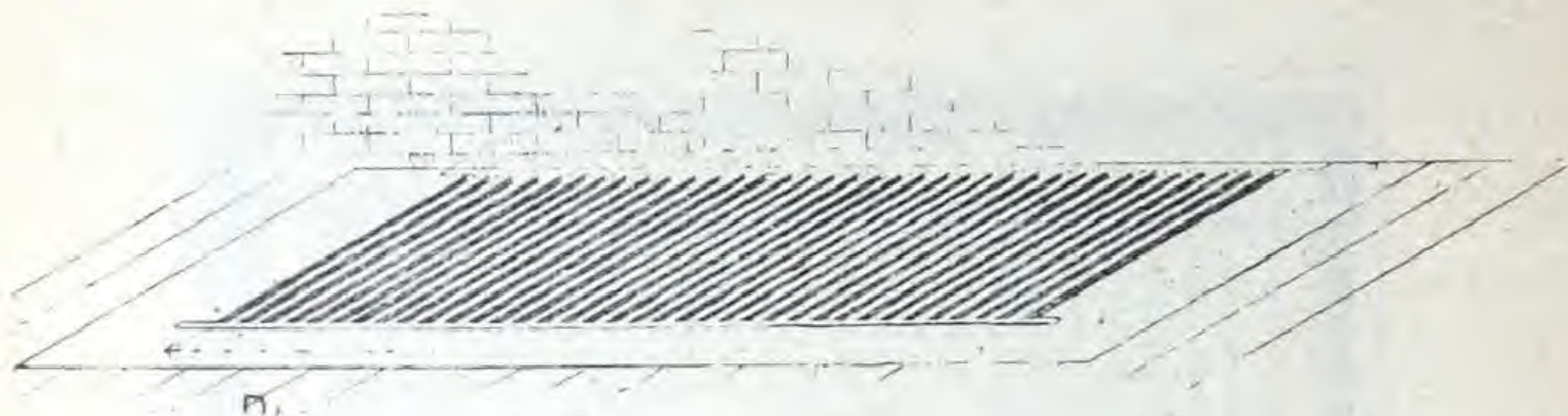
Weight per square foot, out to out measurements, 14 lbs. Cost per square foot, 90c., F.O.B., Winnipeg.

Write for discounts stating sizes required. Other types or styles of gratings are shown by Nos. 163 and 164.

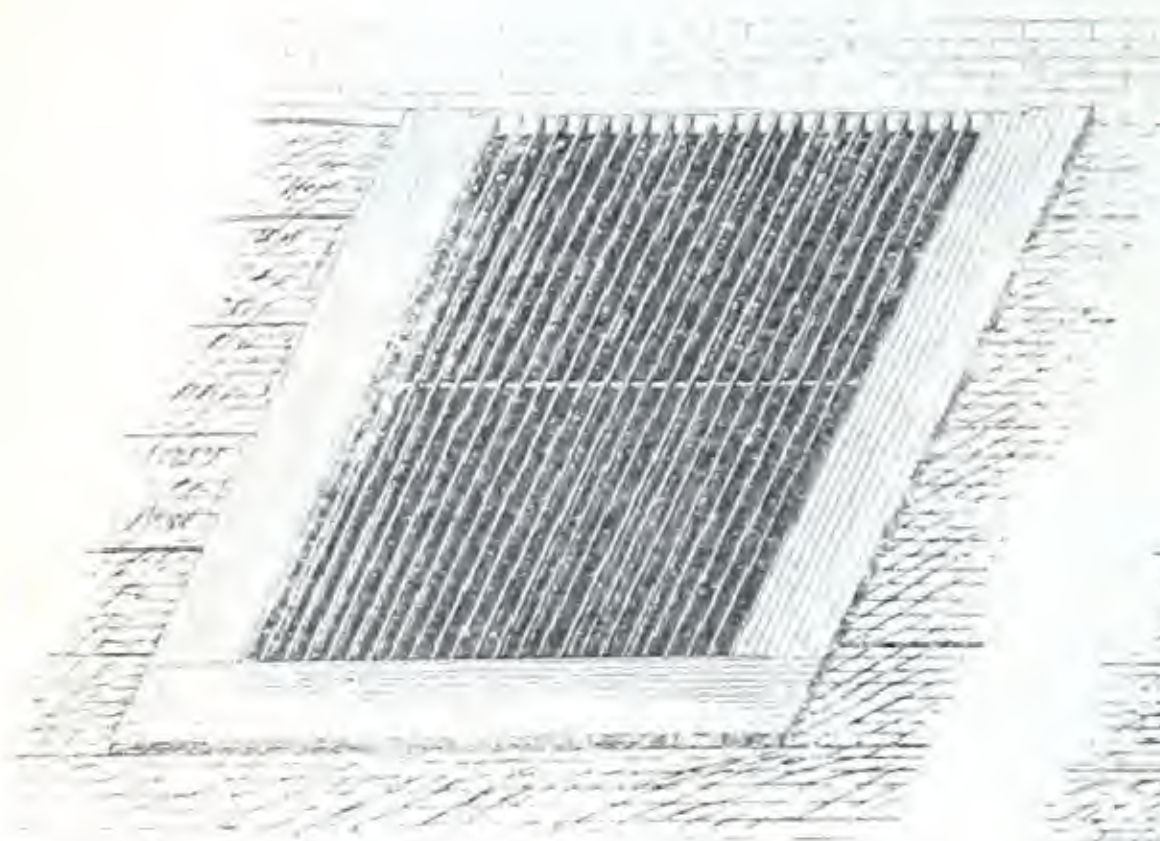
Any style of any size can be furnished on short notice as a large assortment of flats, rounds and angles is carried in stock for this work.



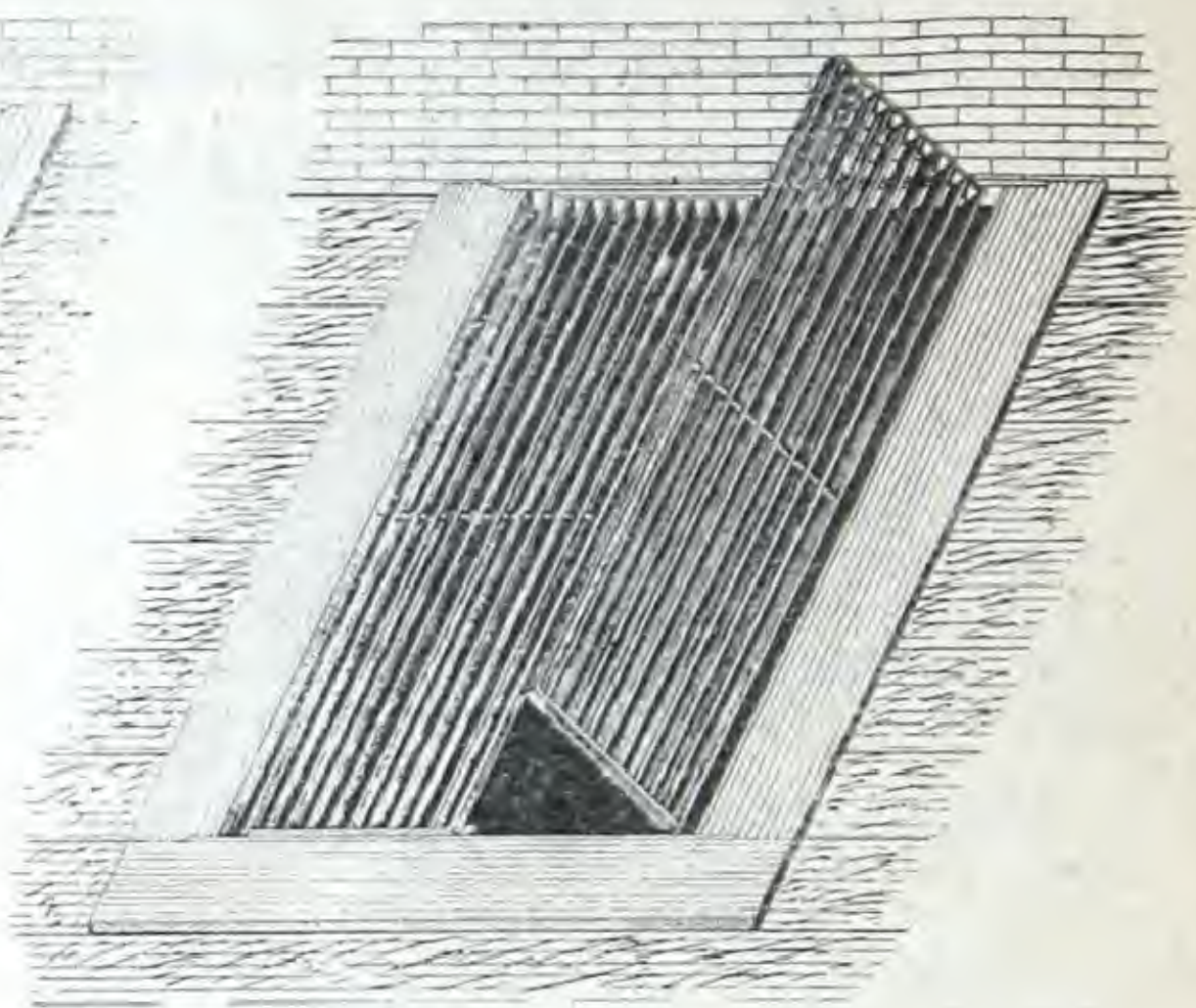
No. 163—Area Grating. Wrought iron, slats fastened to frame at ends. Stiffening rod in centre.

Area Gratings and Sidewalk Doors—*Continued*

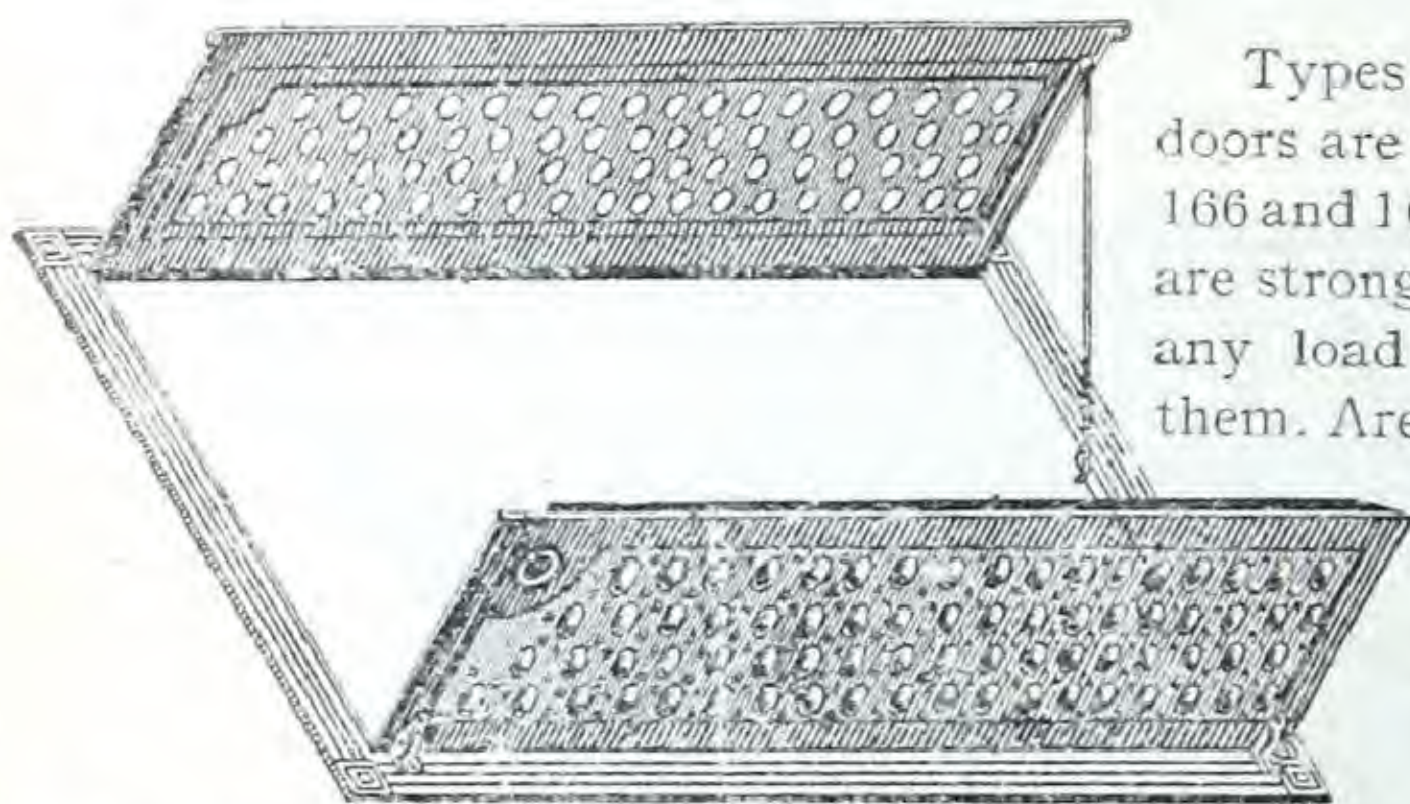
No. 164—Area Grating. Wrought iron, slats fastened to frame at ends. No separators or stiffeners.



No. 165—Area Door, steel Grating. Made in one piece—closed.



No. 166—Area Door, steel Grating. Two pieces—open.



No. 167—Sidewalk Door, made in two leaves or pieces of steel plates with prismatic lights.

Types of area and sidewalk doors are illustrated by Nos. 165, 166 and 167, page 94. These doors are strongly made and will carry any load likely to be placed on them. Area doors are also made of solid steel plates in angle frames. Locking bars are furnished if required. Prices on application.

Sizes, out to out of openings should be sent in when ordering or asking for prices, also state whether doors are to be in one or two pieces or leaves.

When ordering or asking for prices read carefully "Instructions to Buyers" on page 216

Vault and Sidewalk Lights

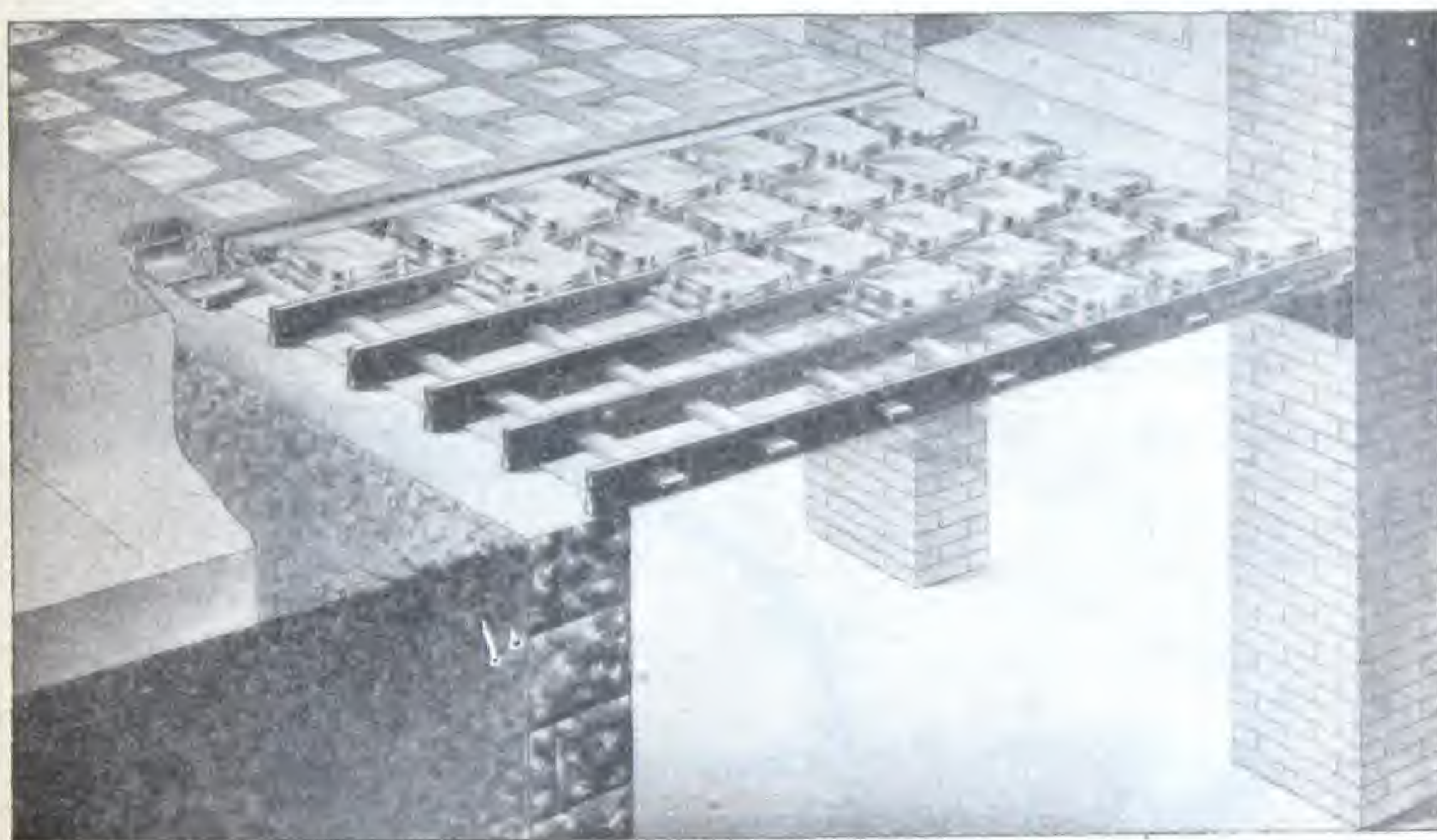
3-Way Prism carried on wrought steel frame work and embedded in cement, watertight.



No. 168—3-Way Prism.



No. 169—3-Way Plain Lens.



No. 170—Showing how 3-Way Prisms are used as sidewalk lights.

A bearing of about two inches on the building side and of about the same area on the wall side should be provided. Bearing should be provided $2\frac{1}{4}$ inches below the finish level as shown in No. 169

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Vault and Sidewalk Lights — *Continued*



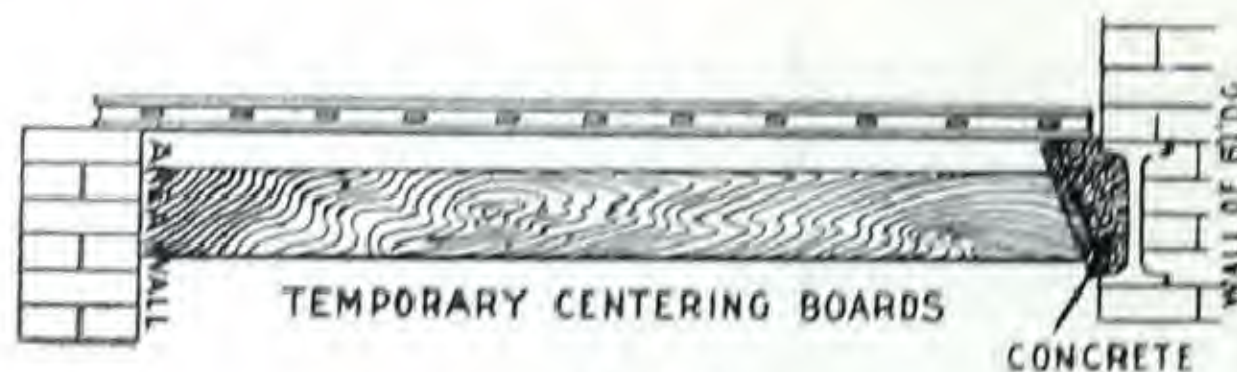
No. 171

Showing one way of placing frame-work for prisms.



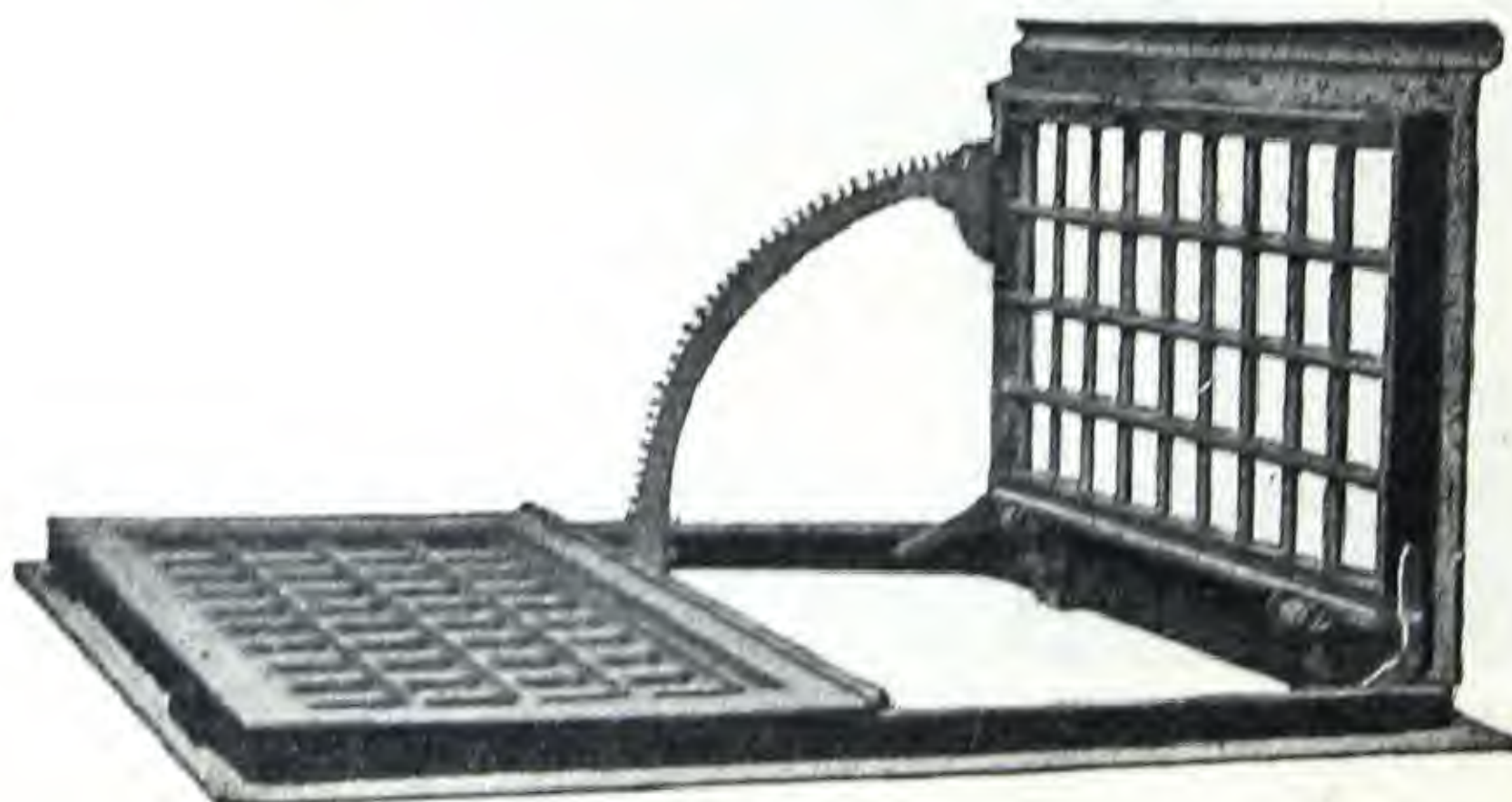
No. 172

Showing another method of framing for prisms.



No. 173

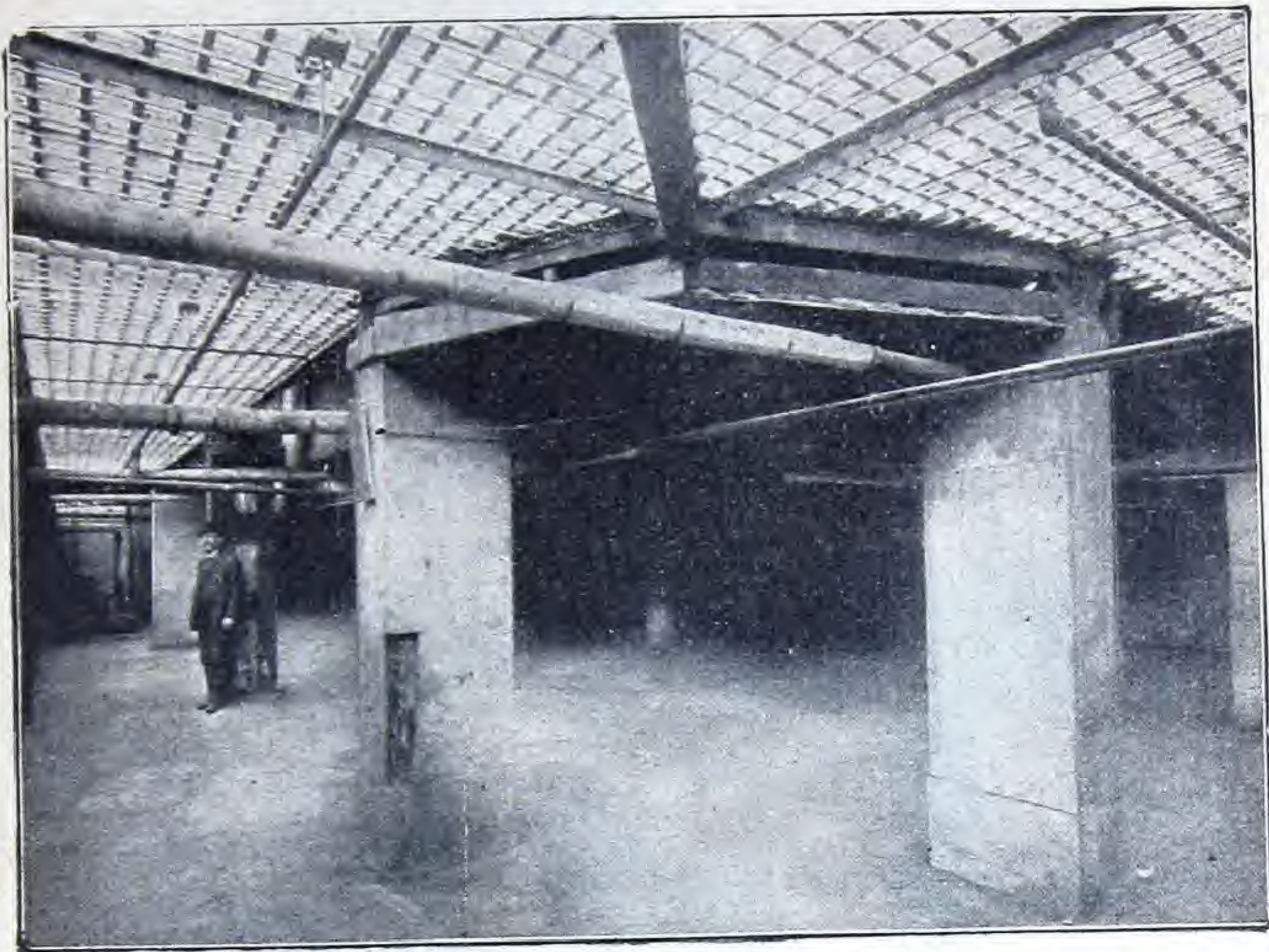
Showing temporary centering for concrete.



No. 174

Hinged Sidewalk Door fitted with prismatic lights. Can be made up of any desired size.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Vault and Sidewalk Lights—*Continued*

No. 175—Showing how space under a building and adjacent sidewalk can be made useful by means of prismatic lights.

TESTS

Sample sections of sidewalk lights 4 feet wide and of the following lengths show under actual test, approximate ultimate breaking loads as below.

SPAN	TOTAL LOAD	LOAD PER SQ. FOOT
3.0 feet	37,333	3,111
4.0 "	28,000	1,750
5.0 "	22,500	1,125
6.0 "	18,666	777
7.0 "	16,000	571
8.0 "	14,000	438
9.0 "	12,444	346
10.0 "	11,250	281

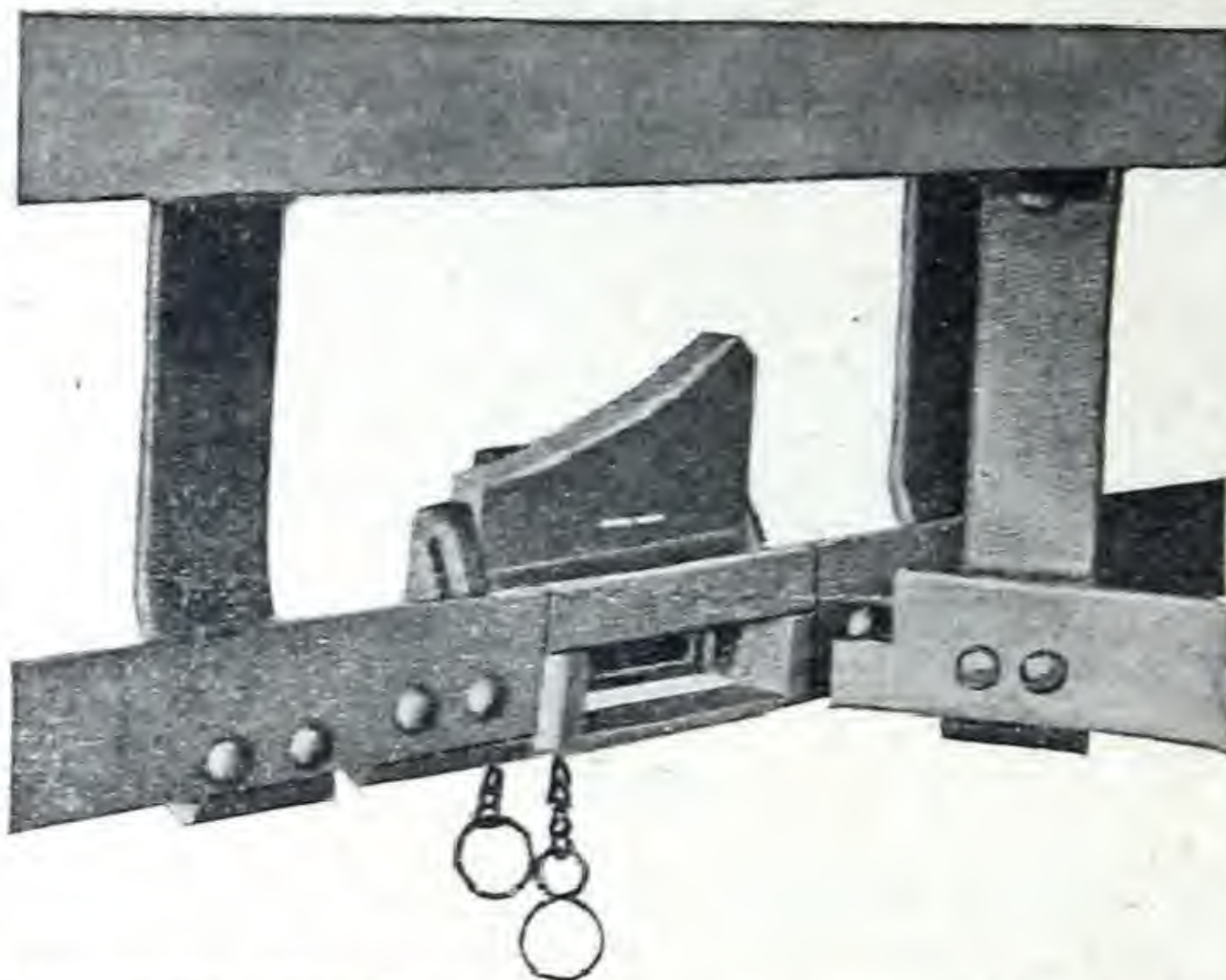
Price per square foot for 3-way prismatic lights, including steel framework, \$2.00. Shipping weight 15 pounds. Discounts will be quoted on application.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Packers' Equipment — Safety Switches

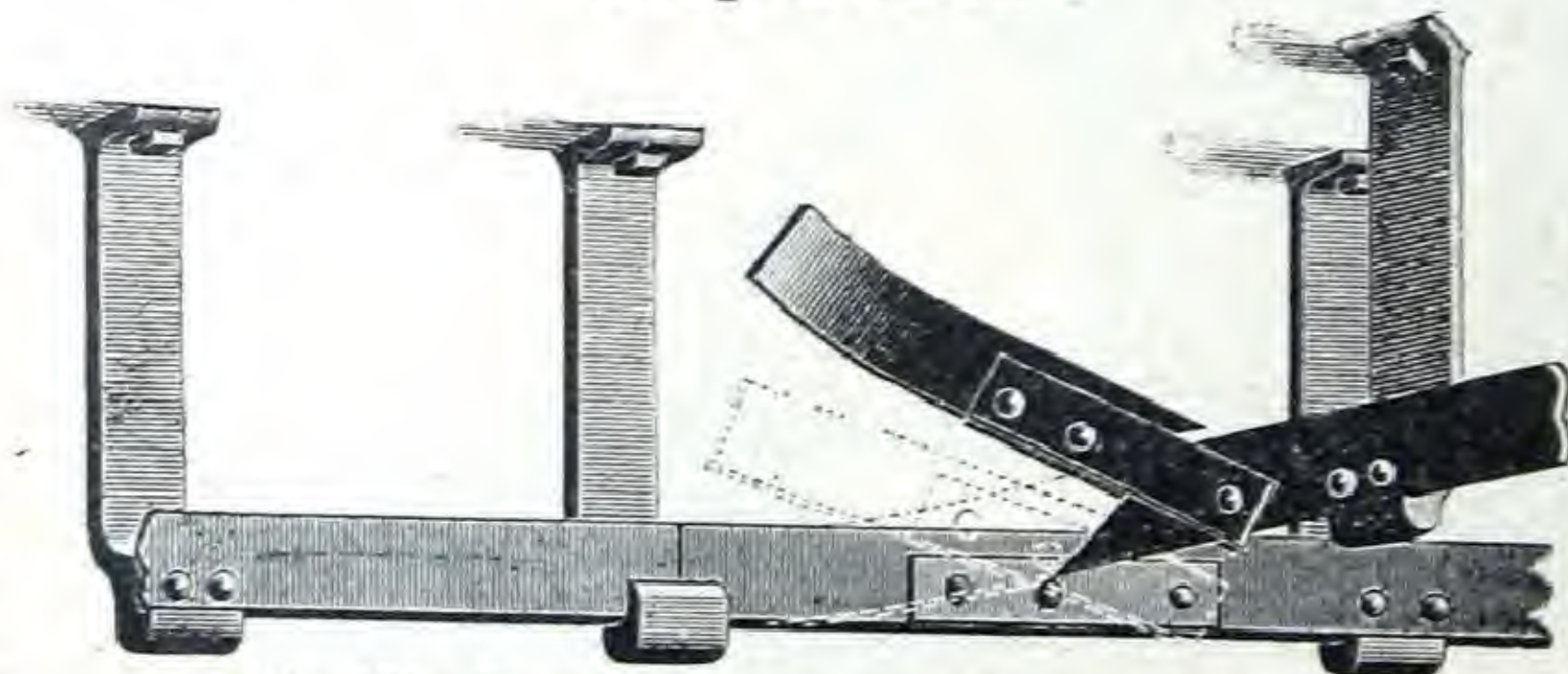


No. 176—Left Boss Switch, showing curved rail connection.



No. 177—Right Boss Switch showing connection with straight rail.

Drop Switch



No. 178—Drop Switch for straight or curved track.

These Switches are guaranteed to take up less space and to carry more weight than any others, and are the only switches equipped with safety devices indicating the position of the switch.

When ordering state whether right or left curved or straight rail and size of rail. Prices on application.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216.

Packers' Equipment — Continued



No. 179—Steel clamp Hanger.



No. 180—Steel Hanger, $\frac{3}{8}$ -inch material.



No. 181—Beef Traveler.

PRICES		PRICES	
10-inch hanger ...	.42	10-inch hanger ...	.36
12-inch hanger ...	.54	12-inch hanger ...	.38

CAST IRON HANGERS

PRICES	
10-inch .....	.35
12-inch .....	.40

PRICES	
Travelers, without chain.....	.50
Travelers, with chain .....	.60

Each Hanger is fitted with screws, and track can be erected without drilling the rail.



No. 182—Hog Traveler. Prices same as No. 181 (without wooden bar).



No. 183



No. 184

Hooks for either beef or hog travelers, 24-inch long.....30c each.

Wrought iron or steel hooks, any size or shape, can be made up and shipped promptly, see Nos. 183 and 184

We manufacture any style of Traveler or Hook and can furnish them on short notice.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Jacket Kettle



No. 185

Jacket Kettles will be constructed any desired size, with or without stand-pipes. Agitators furnished with all large sizes.

PRICES

500 pounds capacity.....	\$200.00
750 pounds capacity.....	225.00
1,000 pounds capacity, with agitator	250.00
2,000 pounds capacity, with agitator	350.00
3,000 pounds capacity, with agitator	400.00
4,000 pounds capacity, with agitator.....	450.00
5,000 pounds capacity, with agitator.....	500.00

Discounts on application.

Besides the switches, hangers, travelers, hooks and tanks mentioned above, we manufacture Hog Shackles, Friction Hoists, Hog Cradles, Beef Hoists, Beef Droppers, Bone Washers, Bone Saws, Hoof Pullers, Shackles, Oleo and Neutral Plants, Rack Travelers, Sliding Hooks, Car Hooks, Hashers, Gambrels, Presses of all kinds, either hand or screw power or hydraulic Light Rails, Trucks, Ice Tools, Pipe Fittings, Shafting, Collars, Flanged Face Couplings, Counter Shafts, Shaft Hangers, Pulleys, Journal Bearings, Pillow Blocks, Sprocket Wheels, Sprocket Chain riveted or pin connected.

We are sole selling agents in Western Canada for the "Moline" Malleable Iron Riveted Sprocket Chains.

Current prices on all packing house equipment, and supplies furnished on application.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Rendering Tanks



No. 186

We are prepared to furnish on reasonable notice Tanks, Kettles, Coolers and all boiler work needed in rendering.

Prices of a few stock sizes as below:

No.	GALLONS	DIAMETER	HEIGHT	WEIGHT	PRICE
1	150	30-in.	42-in.	975 lbs.	\$ 85.00
2	225	30-in.	66-in.	1125 "	105.00
3	300	42-in.	48-in.	1735 "	120.00
4	400	42-in.	64-in.	1835 "	145.00
5	500	42-in.	80-in.	2050 "	170.00
6	600	48-in.	76-in.	2740 "	195.00
7	700	48-in.	89-in.	2890 "	220.00
8	800	48-in.	102-in.	3000 "	245.00
9	900	48-in.	115-in.	3200 "	270.00
10	1000	48-in.	128-in.	3400 "	295.00

Large Tanks

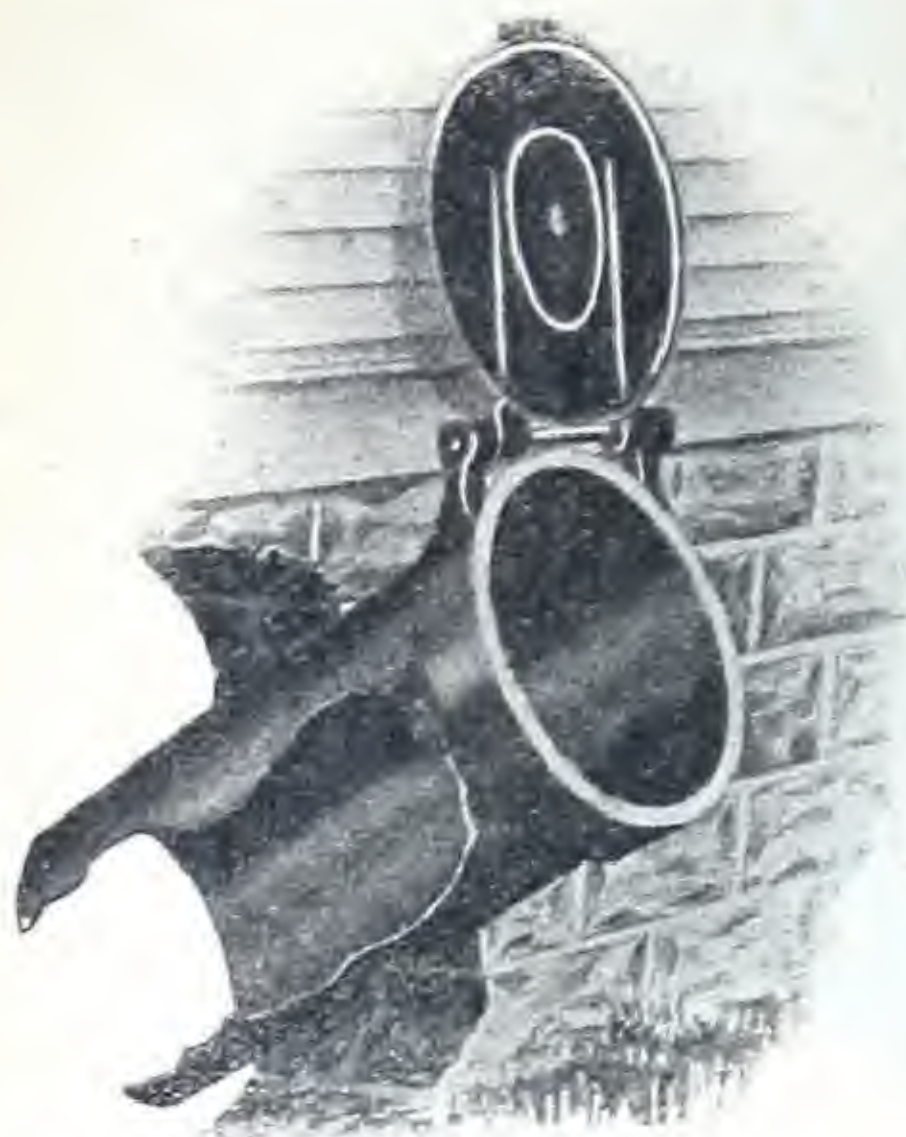
5 feet diameter, 10 feet high	\$450.00
6 feet diameter, 12 feet high	600.00
6 feet diameter, 16 feet high	700.00

Above prices are only approximate. Write for exact prices and discounts, giving full particulars as to size.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Fuel Chutes

The "Roenius" Patent Fuel Chute is a well known type, having a round barrel made of sheet steel, two doors of cast iron, automatic lock. Either pattern, round or square. Any size can be shipped from stock.



No. 187—"Roenius" Round pattern—open. No. 188—"Roenius" Round pattern—closed

MADE IN TWO SIZES

SIZE	WEIGHT	PRICE
18 in. x 36 in.	140 lbs.	\$15.00
26 in. x 36 in.	270 "	25.00



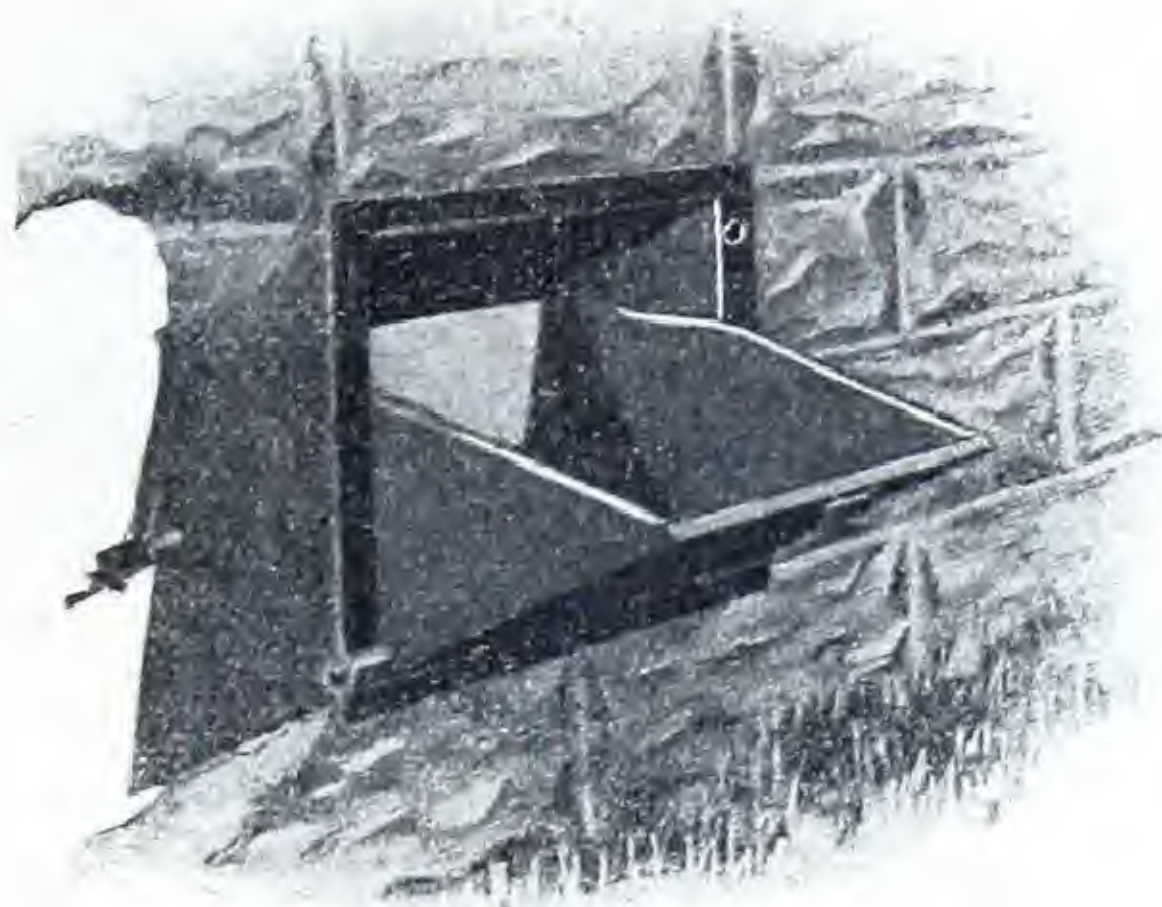
No. 189—"Roenius" Square pattern—closed.

MADE IN TWO SIZES

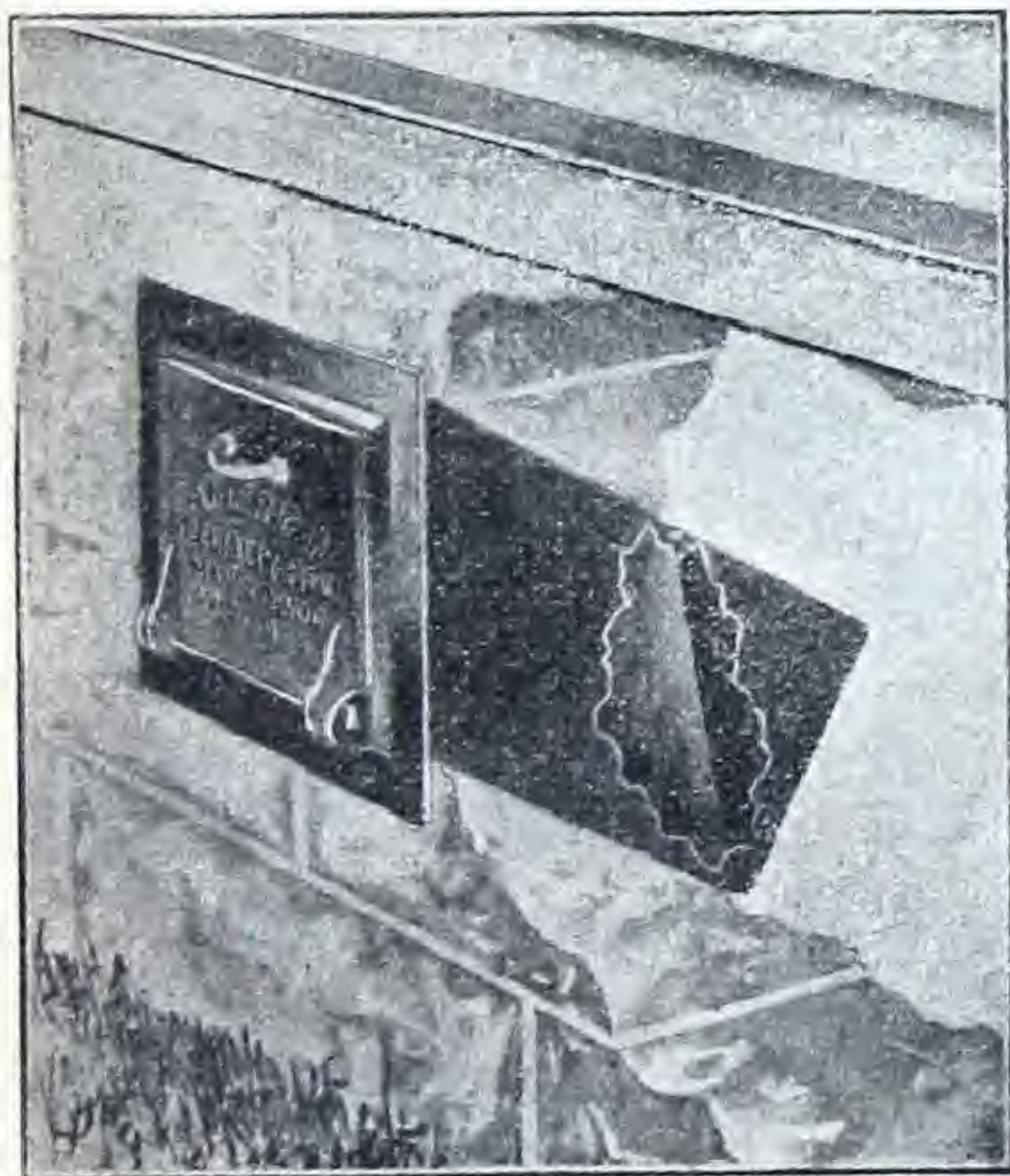
SIZE	WEIGHT	PRICE
16 in. x 20 in.	100 lbs.	\$12.00
16 in. x 24 in.	135 "	14.00

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

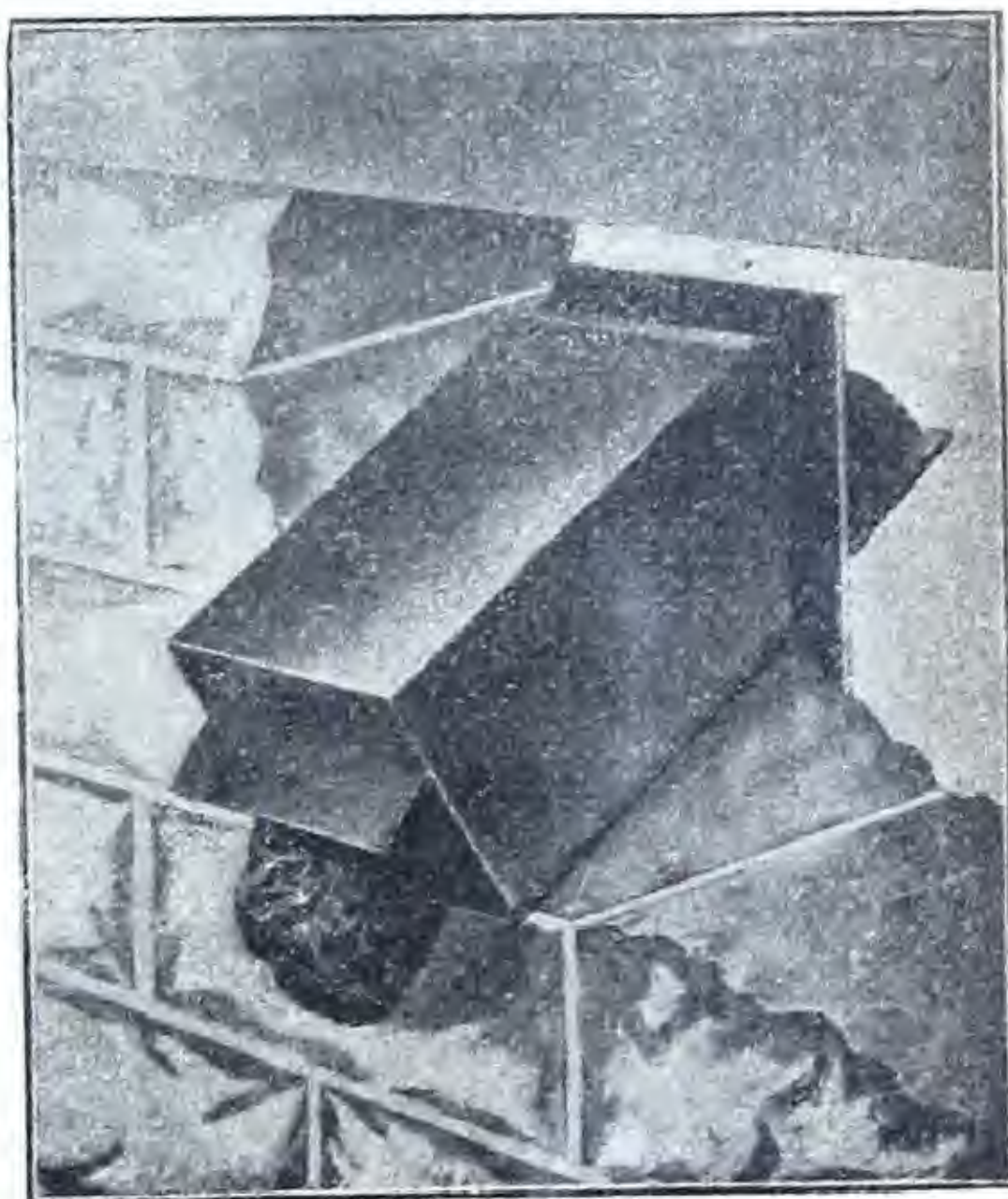
Fuel Chutes—*Continued*



No. 190—"Roenius" Square pattern—open.



No. 191—"American" Pattern—closed.



No. 192—"American" Pattern—open.

The "American" pattern is also popular. We can ship these fuel chutes from stock at any time.

SIZES	WEIGHT	PRICE
19 in. x 19 in. wall opening	120 lbs.	\$10.00
20 in. x 28 in. wall opening	285 "	18.00
22 in. x 24 in. wall opening	290 "	20.00

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Fuel Chutes — *Continued*

THE MANITOBA FUEL CHUTE

(Patent applied for.)

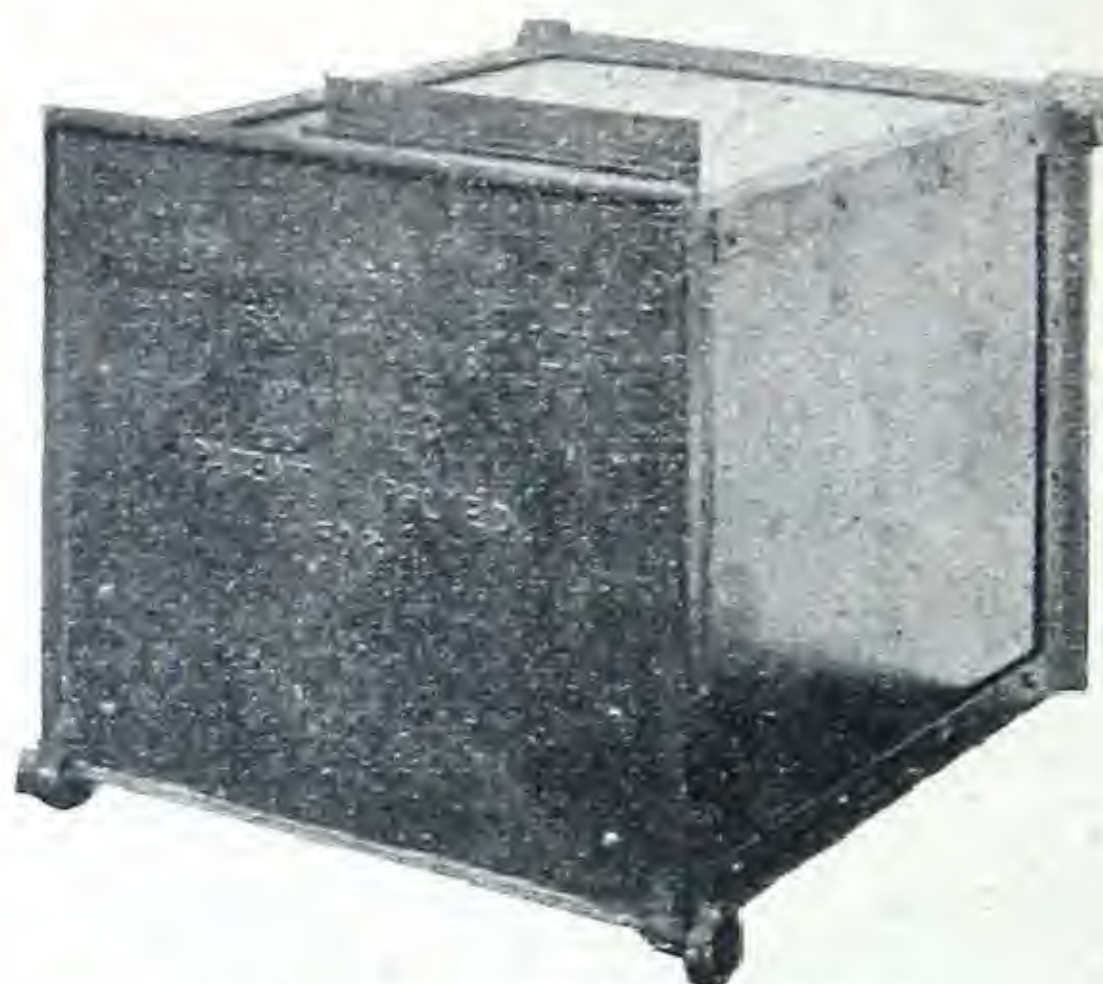
MADE IN TWO SIZES

No. 1.—For residences, 18 in. x 18 in. inside measurements. Length, 30 ins.

No. 2.—For other buildings, 24 in. x 24 in. inside measurements. Length 30 ins.



No. 193—Manitoba Chute—open.



No. 194—Manitoba Chute—closed.

SPECIFICATIONS

Barrel is made of No. 14 Gauge sheet steel reinforced at corners with steel angles, all riveted.

Doors at each end are heavy cast iron, swinging on heavy rod hinges.

Hopper is made of cast iron.

These Fuel Chutes have Automatic Locking Device on each door and the Chute can only be opened from inside the building. The action of lifting the inner door lowers the outer door which remains open owing to its weight. When the outside door is closed, the inner door closes and locks automatically.

This type of Fuel Chute is new and combines all the best features of other Chutes now on the market with none of their disadvantages.

Workmanship is first-class and every Chute painted with two coats of weather proof paint. Outside door can be set flush with wall when in place.

PRICES

No. 1	.....	Weight, 260 lbs.	\$18.00 F.O.B. Winnipeg.
No. 2	.....	" 385 "	\$26.00, " "

WRITE FOR DISCOUNTS

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Fuel Chutes — *Continued*

The "Majestic" is a well known pattern of the square flush type and is well made and very serviceable. We can ship any size from stock.



No. 195—"Majestic" Fuel Chute—open.

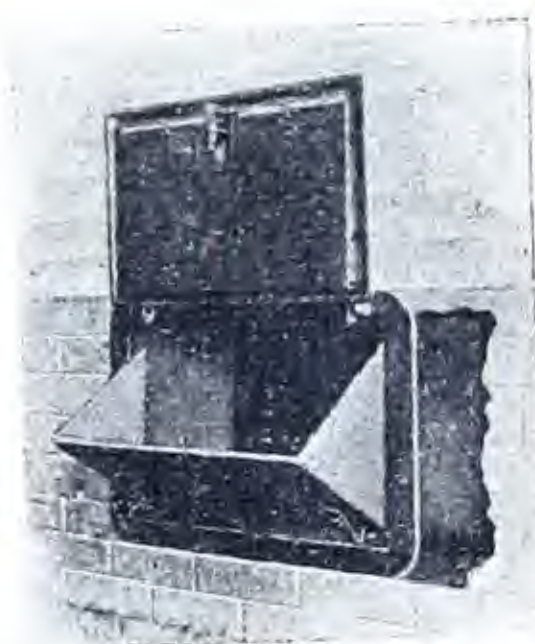


No. 196—"Majestic" Fuel Chute—closed.

No.	SIZE OF OPENING IN WALL	WEIGHT	PRICE
1	16 in. high, 22 in. wide, 13 in. deep.....	104 lbs.	\$12.00
2	16 in. high, 27 in. wide, 13 in. deep.....	122 "	15.00
3	22 in. high, 33 in. wide, 18 in. deep.....	154 "	22.00

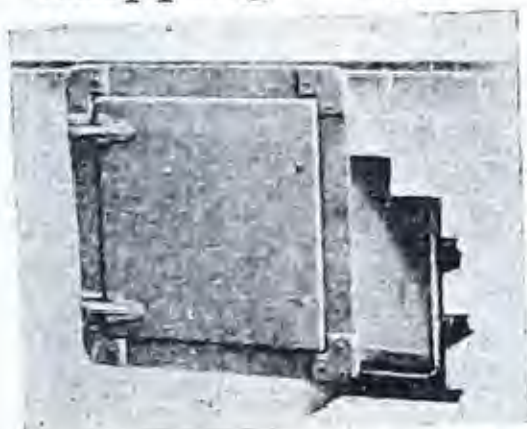


No. 197—"Model" Fuel Chute—closed.



No. 198—"Model" Fuel Chute—open.

The "Model" Fuel Chute has rubber glass set in the outside door or cover and serves as a window as well as a fuel chute. Wire netting can be substituted for the glass. The body and hopper are made of steel and the door and frame of cast iron. Made in one size. Wall opening 27 in. long, 16 in. high, 13 in. deep. Shipping weight 130 lbs. Price.....\$15.00



No. 199—"Pittsburg" Fuel Chute.

The "Pittsburgh" Fuel Chute fills a demand for a steel chute when coarse coal or wood is used for fuel. The body is made of No. 16 sheet steel. The door of No. 10 boiler plate, the frame of heavy cast iron. It is automatically locked on the inside by a heavy gravity latch. Made in two sizes.

No.	SIZE OF WALL OPENING	WEIGHT	PRICE
18	18 in. x 18 in., depth 13 in.....	170 lbs.	\$12.00
24	24 in. x 24 in., depth 18 in.....	220 "	15.00

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

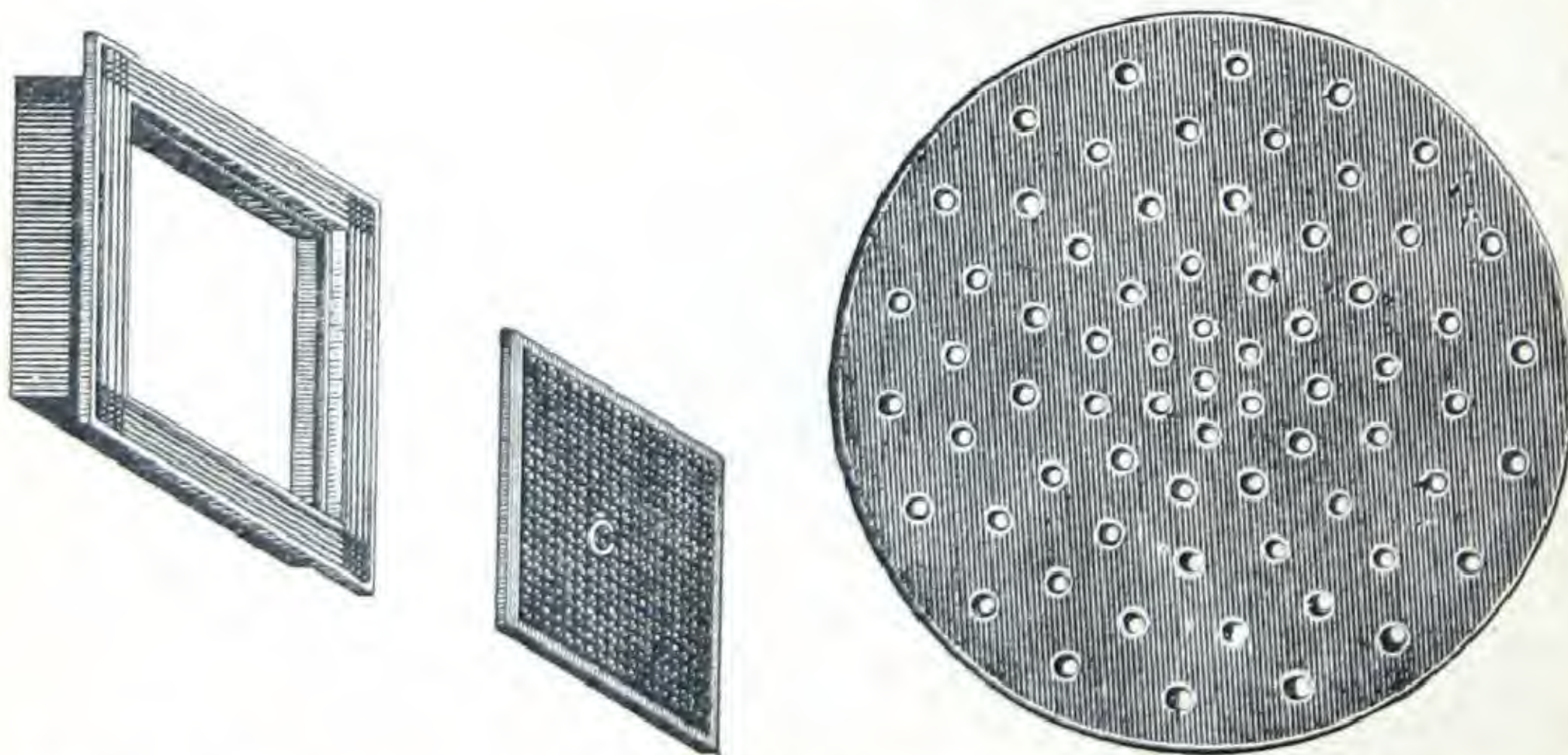
Fuel Chutes — *Continued*

Sometimes a fuel chute is wanted having an opening in the side-walk, so that coal or wood can be unloaded from wagons directly into the building by means of a chute or slide, extending from the opening to inside of building.

The oval pattern of sidewalk opening as shown by No. 200, page 106, is generally used and a sheet steel barrel is made, extending under the sidewalk to the basement of the building, having a door at basement end which can be securely locked. We make all lengths of chutes of this kind. Prices on application. When ordering give length from inside edge of sidewalk opening to inside of basement wall and state how much drop or slope is wanted. Chutes of this kind can be made up on short notice.



No. 200—Sidewalk frame cover for special Fuel Chute.



No. 201—Cast iron square sidewalk cover with frame.

No. 202—Steel plate sidewalk cover, with raised knobs or projections

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Fuel Chutes—*Continued*

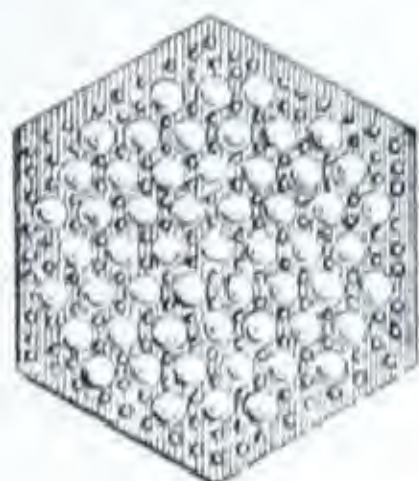
SIDEWALK COAL HOLE COVERS



No. 203—Steel, perforated.



No. 204—Cast iron, corrugated.



No. 205—Cast iron, with projections and lights.



No. 206—Cast iron, with corrugated surface.



No. 207—Cast iron, with lights.



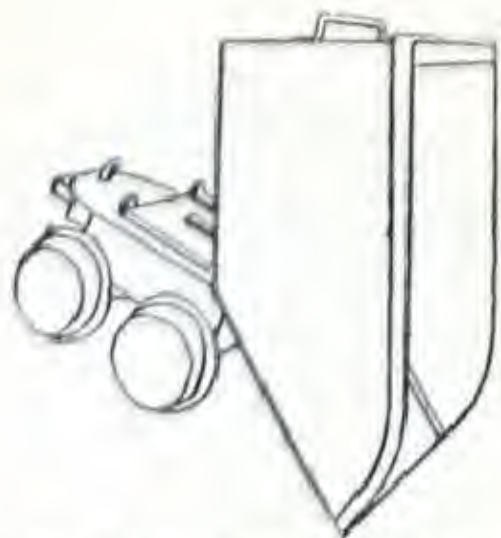
No. 208—Cast iron, with corrugated surface and lights.

Sidewalk coal hole or fuel opening covers are made in a variety of patterns as illustrated. They are sold either with or without frames as required. Prices on application. State size and style wanted when ordering. We have patterns for all of the cast iron covers shown, and prompt shipments can be made. Some of the plainer ones are carried in stock.

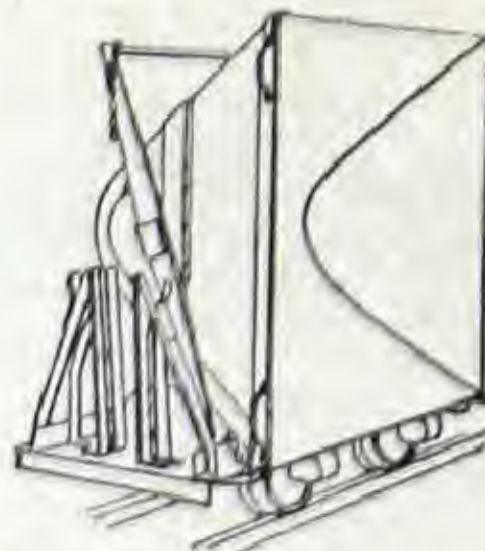
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Contractors' Supplies

MINE CARS



No. 209—End Dump Car.



No. 210—Side Dump Car.

All Steel Dump Cars used for carrying sand, clay, earth, stones, cinders, ashes, coal, concrete, etc. The dumping arrangement is positive and easily worked, none of the contents falling between the rails. Box can be held in a slanting position for convenience in loading.

All cars are made of $\frac{1}{8}$ -inch steel plate riveted. We are prepared to design and manufacture all steel cars for any purpose whatever. Wheels, axles, trucks, etc., will also be furnished without the cars if wanted. We have a number of patterns of car wheels in stock and can promise quick delivery of material.

STEEL RAILS



No. 211—Steel Rails.

Steel railway rails, all sizes and weights, new and relaying, for reasonable delivery. We usually carry a few tons of relaying rails of from 12 pounds to 30 pounds per yard in weight. Fish plates, bolts, spikes, frogs, switches, and turn-tables supplied.

For weights and dimensions of rails, also size of bolts and spikes, see next page.

Contractors' Supplies — *Continued*

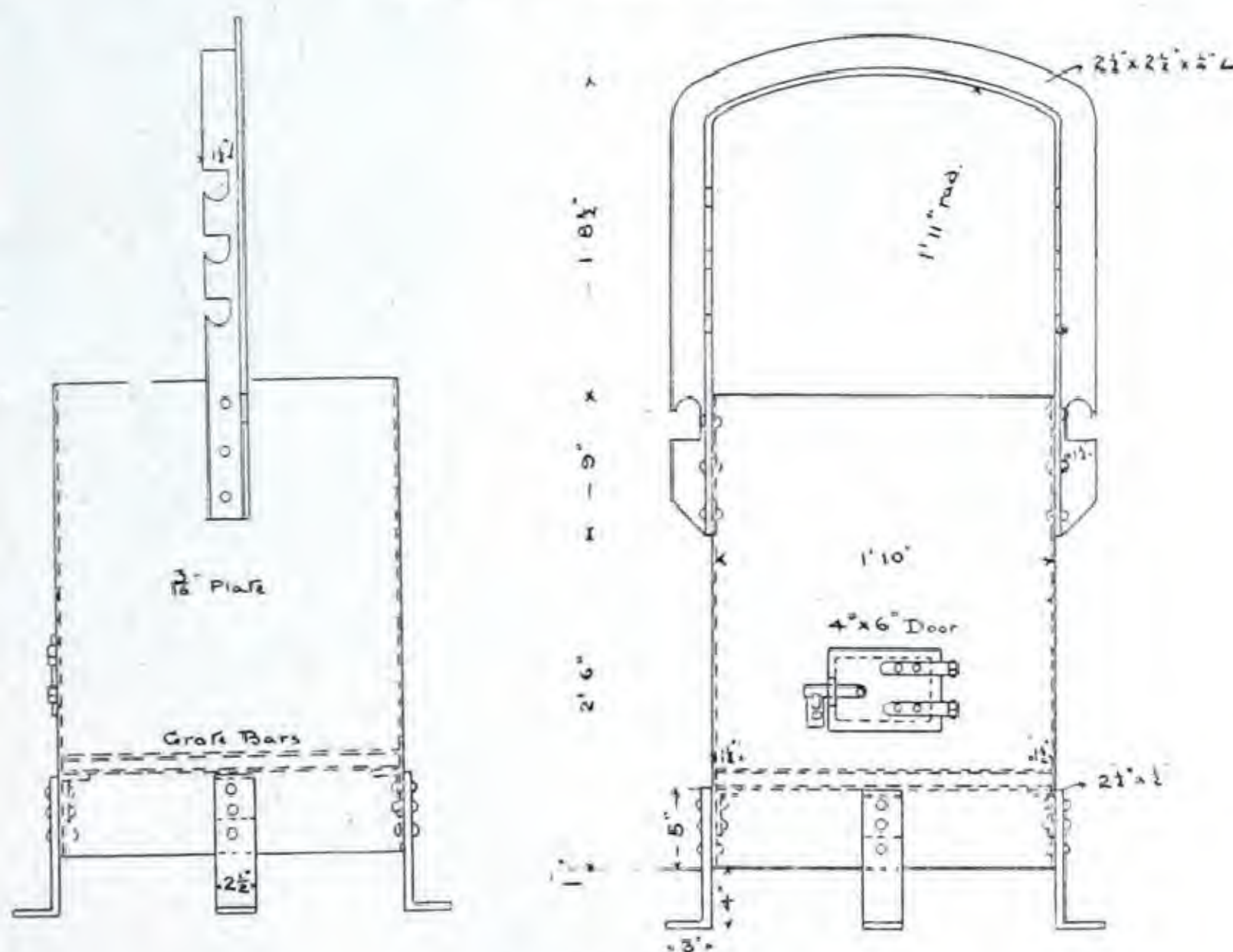
WEIGHTS AND DIMENSIONS OF RAILS

Weight of Rail per yard Pounds	12	16	20	25	30	35	40	45
Approx. Hgt. of Rail and Width of Base Inches	1 $\frac{7}{8}$	2 $\frac{1}{4}$	2 $\frac{3}{8}$	2 $\frac{3}{4}$	3	3 $\frac{5}{16}$	3 $\frac{1}{2}$	3 $\frac{11}{16}$
Track per Gross Ton Feet	280	210	168	134	112	96	84	74 $\frac{2}{3}$
Size of bolts usu- ally supplied Inches	$\frac{1}{2}$ x1 $\frac{1}{2}$	$\frac{1}{2}$ x1 $\frac{3}{4}$	$\frac{1}{2}$ x2	$\frac{5}{8}$ x2 $\frac{1}{2}$	$\frac{5}{8}$ x2 $\frac{1}{2}$	$\frac{5}{8}$ x2 $\frac{1}{2}$	$\frac{3}{4}$ x3	$\frac{3}{4}$ x3
Size of spikes usually sup- plied Inches	$\frac{3}{8}$ x3	$\frac{3}{8}$ x3 $\frac{1}{2}$	$\frac{3}{8}$ x3 $\frac{1}{2}$	$\frac{1}{2}$ x4	$\frac{1}{2}$ x4	$\frac{1}{2}$ x4 $\frac{1}{2}$	$\frac{1}{2}$ x5	$\frac{9}{16}$ x5 $\frac{1}{2}$

To estimate the number of spikes required for any length of track allow one spike to every foot of rail or two spikes to every foot of track. Ties are usually spaced 2 feet on centres and there will be four spikes to each tie.

The above dimensions are approximate and are given only as a guide. Prices on all rails on application.

FIELD STOVES



No. 212

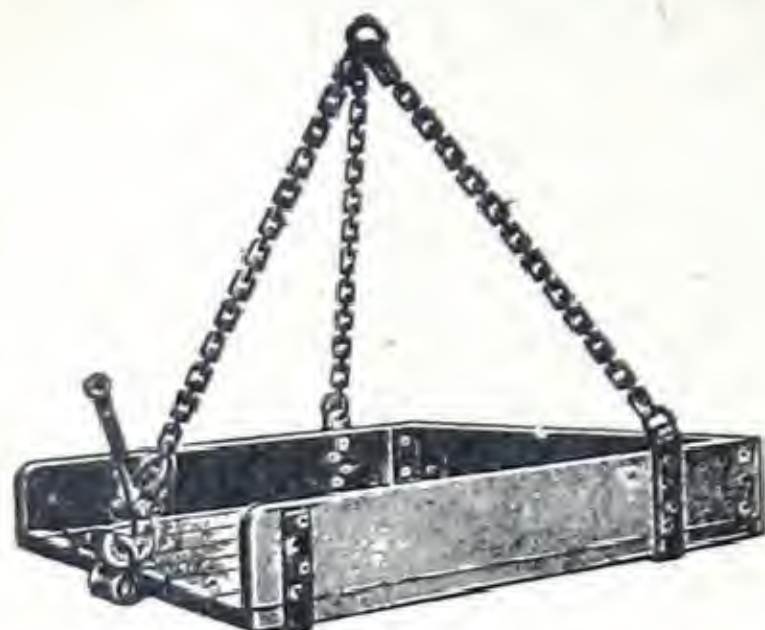
Salamanders or Field Stoves. Used by contractors, water supply companies and others for heating lead on construction work. Stove is made of 3-16 inch metal, riveted. Price of stove, size shown, \$20.00. All sizes made to order. Write for prices giving full description.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Contractors' Supplies — Continued

SKIPS

We supply all kinds of skips for handling stone, clay, earth, etc. When ordering or asking for prices give the fullest information possible, including full dimensions, thickness of plate or wood desired, whether chains are to be attached to back or to sides, etc.



No. 213—Wooden Derrick Skip.



No. 214—Steel Derrick Skip.

SELF DUMPING MINE BUCKETS



No. 215



No. 216

SPECIFICATIONS for No. 215

Capacity	Diam. Inches	Depth Inches	Weight Pounds	Price
$\frac{1}{4}$ Cubic Yards	22	31	250	35.00
$\frac{1}{2}$ " "	31	31	300	42.50
$\frac{3}{4}$ " "	35	37	375	53.00
1 " "	37	43	500	65.00
$1\frac{1}{2}$ " "	43	49	600	72.50

Other sizes cost proportionately more or less. These buckets are made of $\frac{3}{16}$ inch steel, except the $1\frac{1}{2}$ yard Bucket, the bottom of which is made of $\frac{1}{4}$ inch steel.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Contractors' Supplies — *Continued*

SELF DUMPING MINE BUCKETS

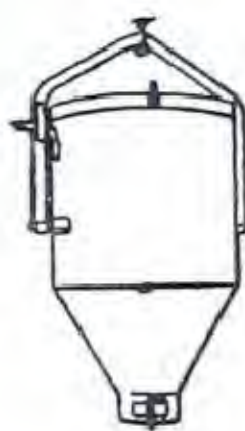
SPECIFICATIONS for No. 216

CAPACITY	Diameter		Depth Inches	Weight Pounds	Price
	Top Inches	Bottom Inches			
8 Cubic Feet	26	23	27	240	42.50
10 " "	29	25	30	300	47.00
$\frac{1}{2}$ " Yard	32	27	35	360	50.00
$\frac{3}{4}$ " "	36	31	40	430	56.00
1 " "	39	34	45	500	65.00
$1\frac{1}{2}$ " "	45	40	50	650	77.00

All made of $\frac{3}{16}$ inch steel, except the $1\frac{1}{2}$ Yard Bucket, the bottom of which is made of $\frac{1}{4}$ -inch steel. Write for discounts.



No. 217



No. 218



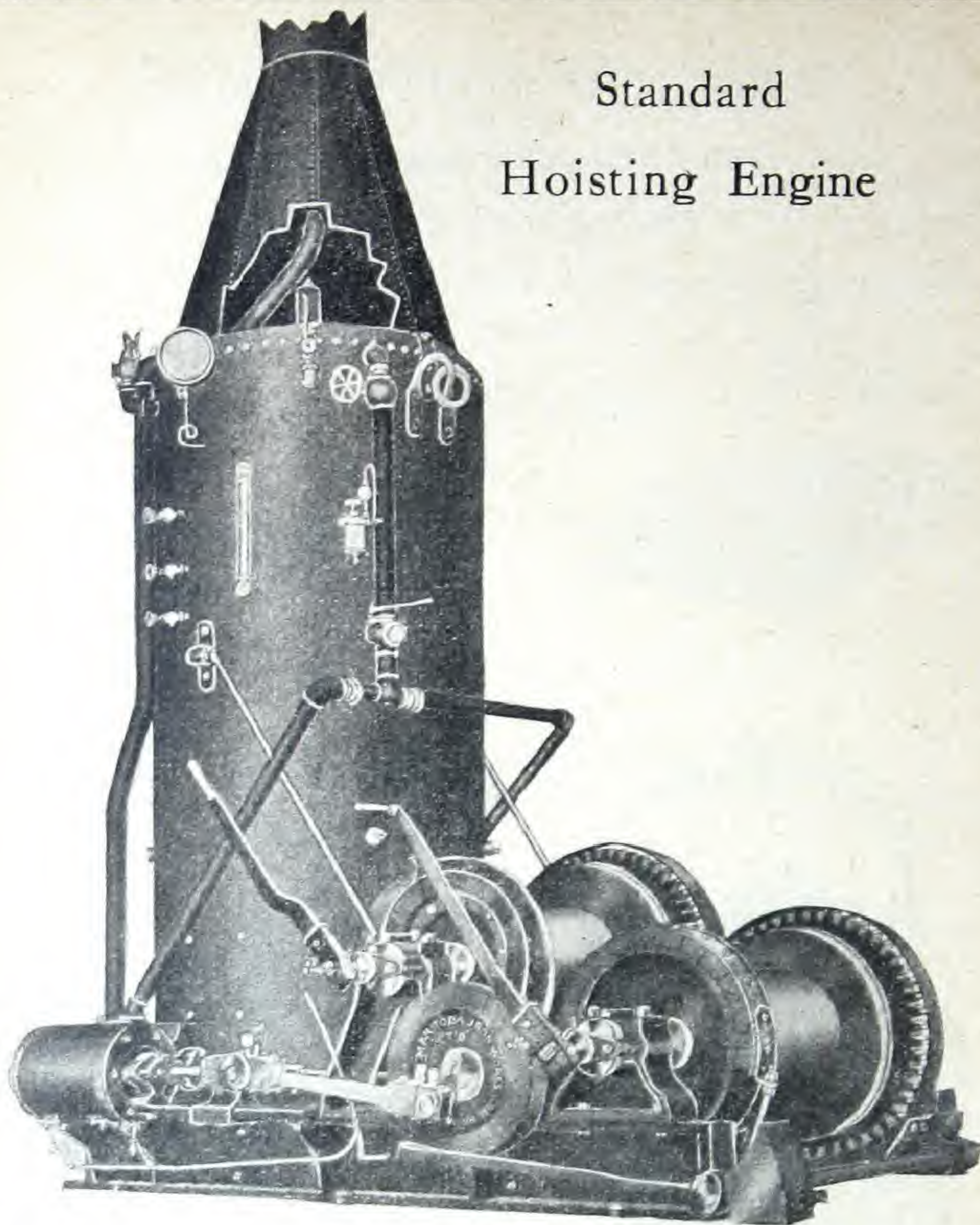
No. 219

Standard Self-Dumping and Self-Righting Contractors' Buckets. Any capacity. Made of $\frac{3}{16}$ inch steel riveted. Write for prices giving full particulars as to height, diameter, etc., etc.

The above illustrations show only a few of the Buckets we make, Special buckets made to order. Send in a sketch showing dimensions, and we will quote prices promptly. We can make up anything of steel or iron at reasonable prices.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Standard Hoisting Engine



No. 220—Standard Hoisting Engine as built by The Manitoba Bridge and Iron Works, Ltd.

Diameter of Cylinders.....	6½ Inches
Length of Stroke	8 "
Diameter of Drums	12 "
Length of Drums	20 "
Diameter of Nigger Head	7 "
Diameter of Boiler	36 "
Length of Boiler	72 "
Length of Flues	48 "
Number on 2-inch Flues	78 "
Working Pressure of Boiler per Square Inch	125 lbs.
Horse Power	18 "
Shipping Weight	7000 "
Length of Base	72 Inches
Width of Base	48 "
Length Over-All of Engine.....	7 ft. 3½"
Width Over-All of Engine	6 ft. 4 "

Any further particulars required will be given on request. Price F.O.B. Winnipeg, \$800.00. Write for discount.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Contractors' Supplies — Continued

SHACKLES OR CLEVISES



Prices on application.

When ordering give all dimensions.



No. 221—Wrought iron or steel Clevis with threaded pin.

No. 222—Wrought iron or steel Clevis with round pin and cotter.

IRON SHEAVES



No. 223—Sheave for regular and thick Mortise Blocks roller bushed.



No. 224—Sheave for wire rope, —deep groove.



No. 225—Boom Sheave with steel axles and journal boxes.

Boom Sheave—No. 225

Diam. of Sheave in inches,	10	12	14	16	18
Wire Rope, diameter in inches	$\frac{3}{4}$ & $\frac{1}{2}$	$\frac{1}{2}$ & $\frac{3}{4}$	$\frac{3}{4}$ & 1	1 & $\frac{1}{2}$	1 & 1
Price,	\$7.00	\$7.50	\$8.50	\$9.50	\$10.50

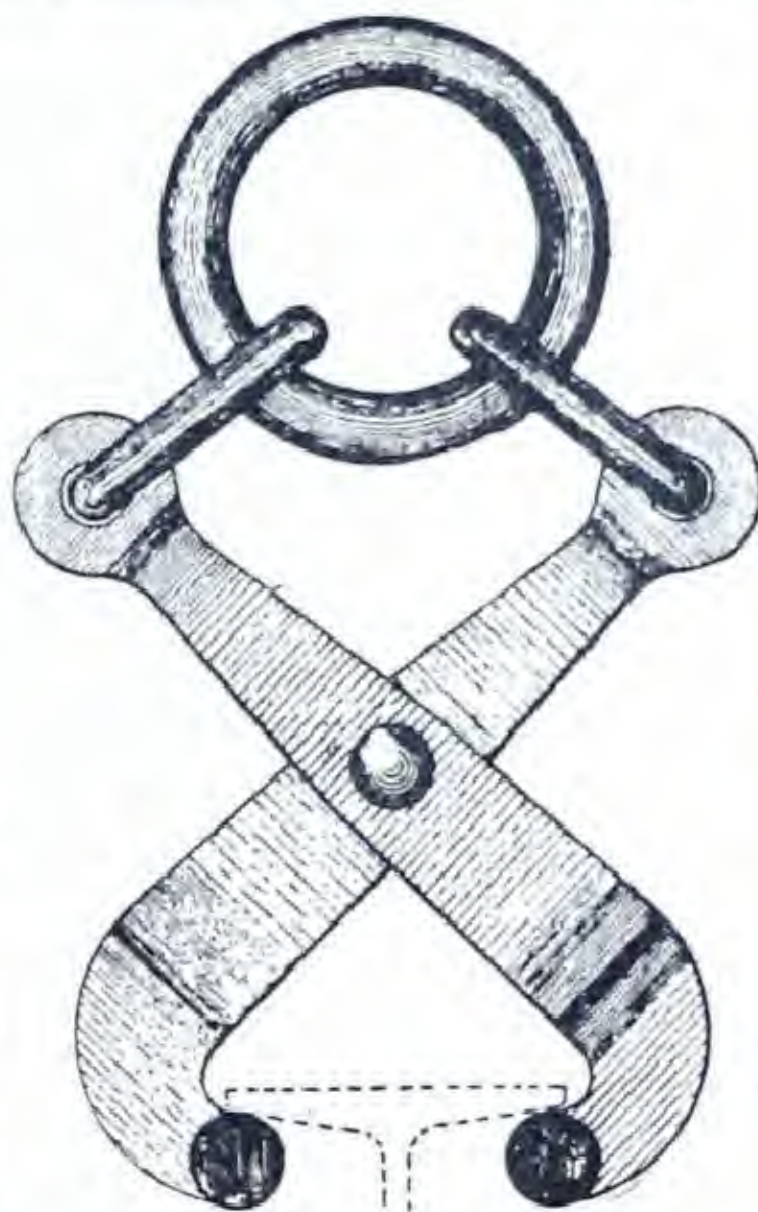
WRITE FOR DISCOUNTS

We make sheaves of all sizes for wire or manilla rope, and always carry a great many of assorted sizes in stock. These sheaves may be iron bushed, roller bushed, or with phosphor bronze or metaline bushings. Give diameter, bore, number of grooves and size of rope.



No. 226—Wrought iron Gin Blocks for manilla or wire rope, swivel hook.

Any size or style made to order promptly. Iron bushed or roller bushed, self lubricating. When ordering or writing for prices, give diameter of sheave, size and kind of rope, number of grooves required.



No. 227—Beam Clamps, made any size desired. Prices on application. Give dimensions of Beams when ordering.

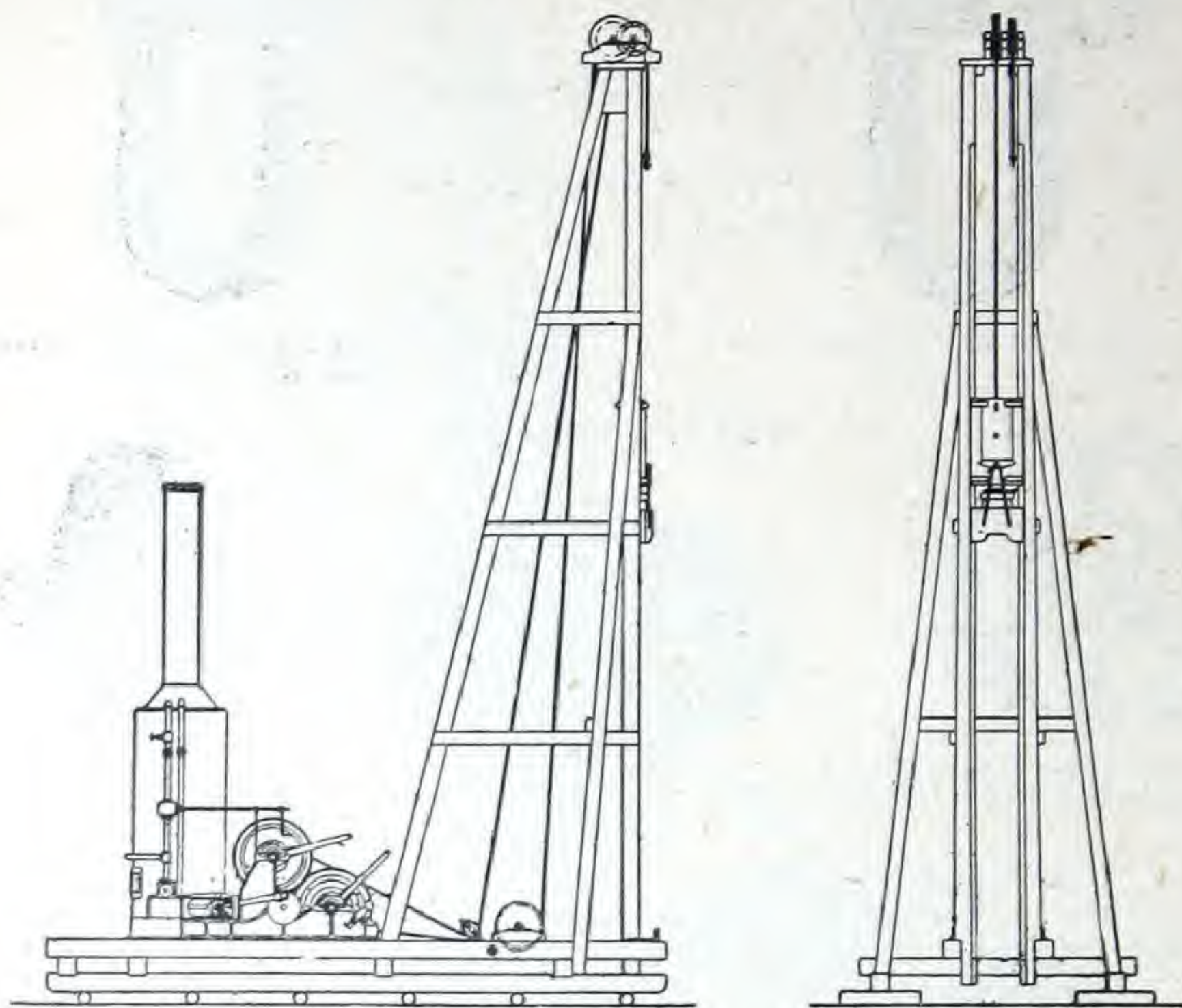


No. 228—Forged Shackle for removing sheet piling. Any size required will be made. Prices on application.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Contractors' Supplies — *Continued*

PILE DRIVERS



No. 229

CONTRACTORS' STANDARD PILE DRIVER

The illustration shows a driver with extension sills, adapted to carry the engine. They are also constructed with shorter sills for use when the engine is located elsewhere or when it is necessary to move the leaders in a circle for the purpose of driving a number of piles in a limited area. We furnish all iron work required for any kind of Pile Drivers but not the wooden frame work.

A full set of iron work usually consists of the following: Hammer with steel pin fitted in; top sheaves, shafts, boxes and bolts, bottom sheave, shaft, boxes and bolts, toggles with bolts and channel iron liners with bolts and washers. When a pile cap is used, toggles are not required.

Prices for all iron work on application. When ordering or asking for prices state fully the dimensions of driver and give list of iron work required.

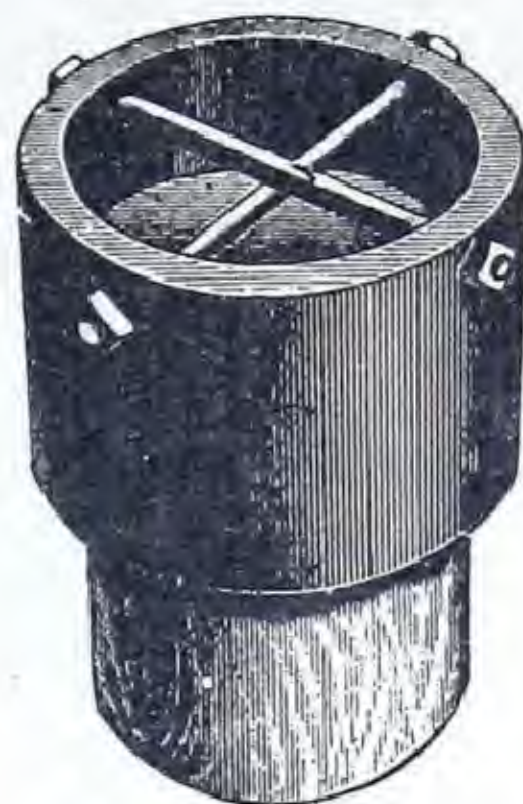
A special form of this driver can be arranged by leaving out the rollers under the sills and substituting rigid roller bearings. Four of these would be used, bolted directly to the lower sill, using either the 10-inch iron pipe or 10-inch oak rollers, the roller lying across the driver instead of lengthwise. Prices on application.

Our Engineering Department will make up designs of any kind of Pile Driver for our customers without charge.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Contractors' Supplies — *Continued*

No. 230—Pile Hammer.



No. 231—Follower Cap.

See next page for particulars.



No. 232—Pile Head Cover.

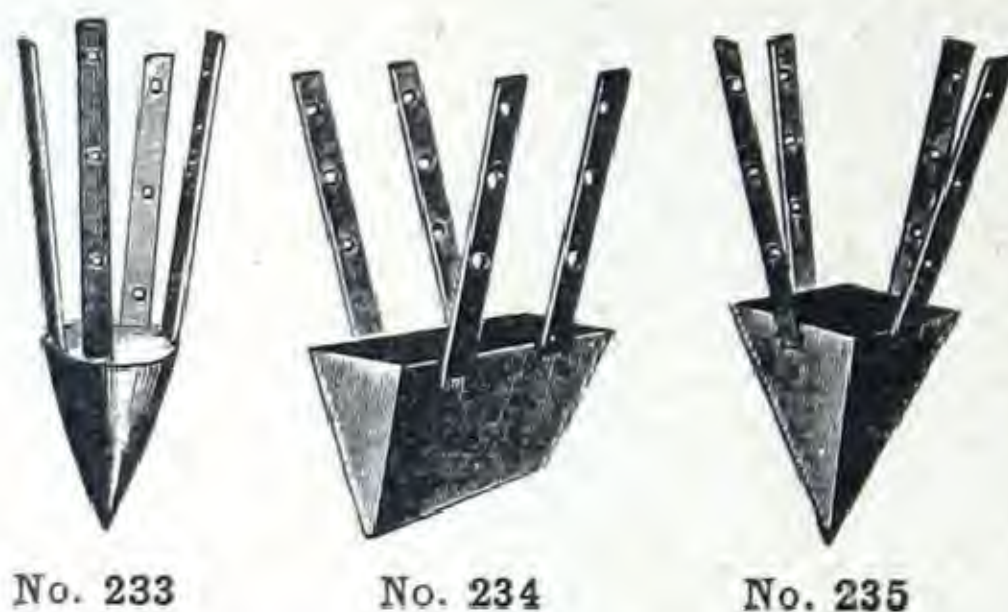
To protect piles from the weather, holes are drilled in sides, and countersunk. Name will be cast in on order of two dozens or more. We have a variety of patterns in stock. Write for prices, giving sizes.

Illustration No. 230 shows a 2,000 pound pile hammer without diamond or nippers. We make large numbers of these hammers of all sizes and weights and have many patterns in stock. Castings of this kind can be turned out very promptly. We also make pile followers of all sizes. Prices on application.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Contractors' Supplies — Continued

In foundation work piles are required to be driven below the surface sometimes 20 feet. When driven to the end of the leaders a follower has to be used for the remaining distance. The Follower Cap shown by No. 231, is recessed on the bottom, the same as the pile cap, to fit over the pile. In its upper end the operator inserts and bolts a pile of the requisite length, with its upper end trimmed to fit into the pile cap or steam hammer. We supply these caps in two sizes; the A size is for piles up to 12 inch diameter follower, and is six inches deep; the casting is 12 inches long over all. The B size is for piles up to 16 inches diameter; the upper recess is for a 14 inch diameter follower and is 8 inches deep; the casting is 15 inches long over all. Bolts are included. Write for prices stating what size is required



No. 233

No. 234

No. 235

Pile Points or Pile Shoes.

No. 233— 6-in. Round, Weight	35 pounds,	Price	\$3.10
" 233— 8-in. " "	78 " "	" "	5.70
" 233— 10-in. " "	150 " "	" "	10.00
" 234— 9 in. x 2½ in. " "	17 " "	" "	2.10
" 234— 9 in. x 3 in. " "	25 " "	" "	2.65
" 234— 9 in. x 3½ in. " "	33 " "	" "	3.15
" 235— 4 in. x 4 in. square	15 " "	" "	2.05
" 235— 5 in. x 5 in. " "	20 " "	" "	2.40
" 235— 6 in. x 6 in. " "	35 " "	" "	3.45

All sizes are measured on the upper or bearing end. The sizes shown will do for piles of much larger size, as the piles should be tapered to fit in the straps.

Spikes are included in prices. Write for discounts.

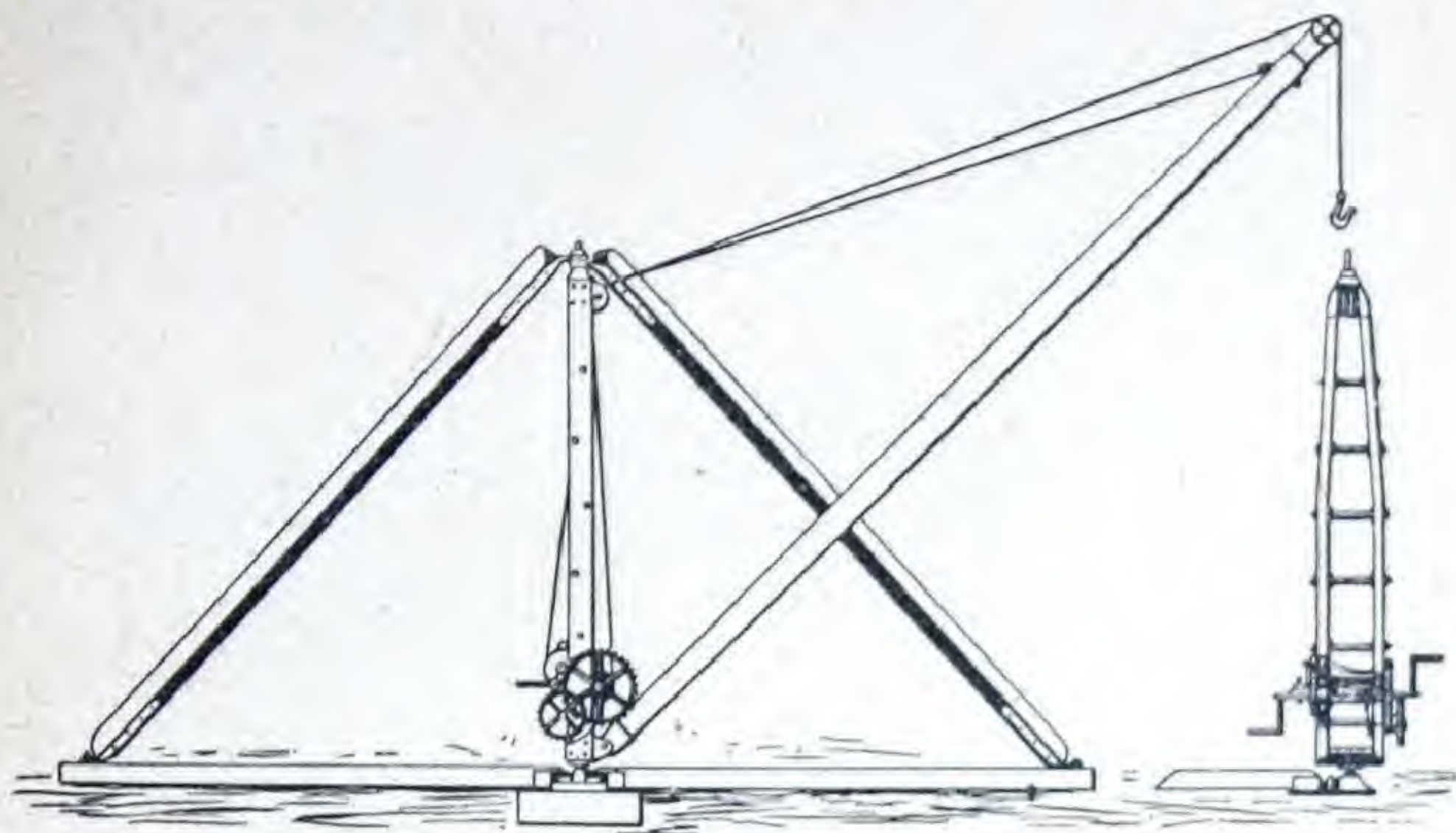


No. 236—Cast iron Cap for sheet piling. All sizes and weights.
Write for prices, giving dimensions of caps wanted.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Contractors' Supplies—*Continued*

SCOTCH DERRICKS



No. 237—Scotch Derrick. (Hand power)

SPECIFICATIONS

Capacity Tons	Length of Boom Feet	Weight Pounds	ROPE EQUIPMENT			
			Diam. Inches	Hoist Feet	Boom Feet	Total Feet
$\frac{3}{4}$	25	2300	$\frac{1}{2}$	80	45	125
1	30	2400	$\frac{1}{2}$	130	55	185
$1\frac{1}{2}$	30-35	2700	$\frac{5}{8}$	140	65	205
2	35-40	3000	$\frac{5}{8}$	150	75	225
3	40-45	4200	$\frac{3}{4}$	150	75	225
4	40-45	4800	$\frac{3}{4}$	150	75	225
5	45-50	5700	$\frac{3}{4}$	150	110	260

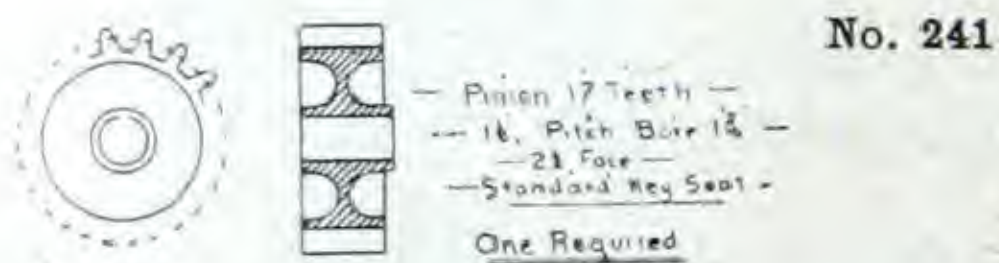
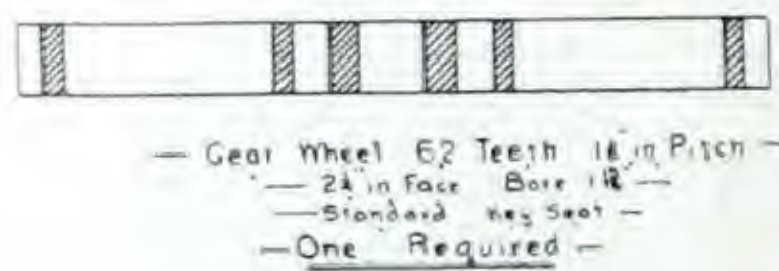
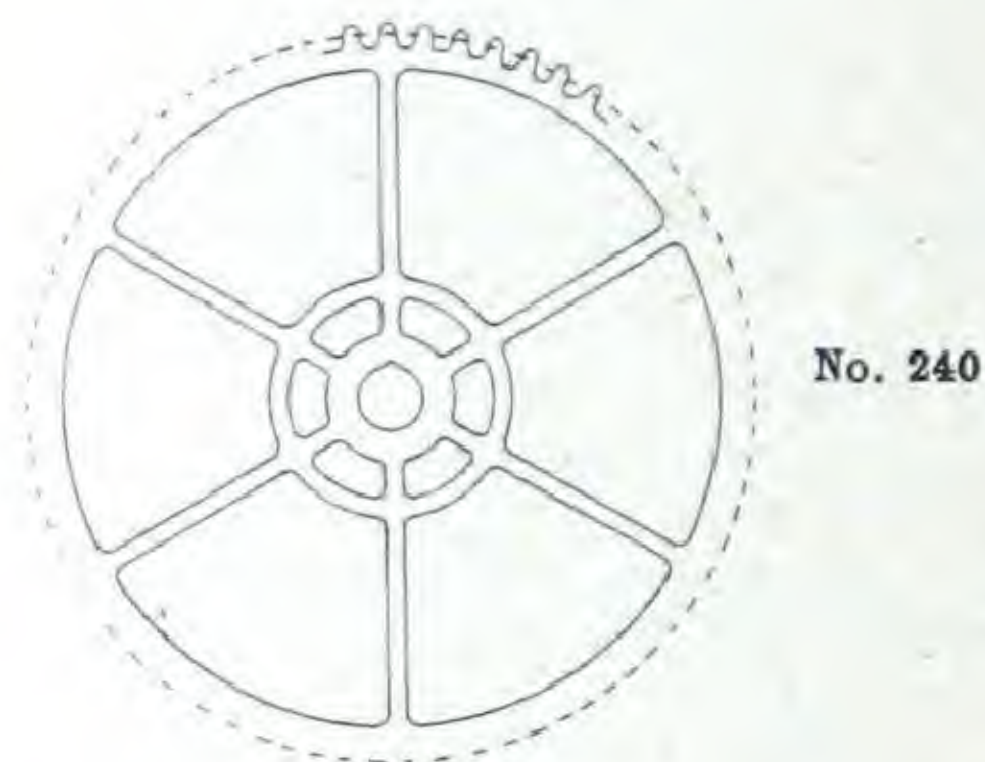
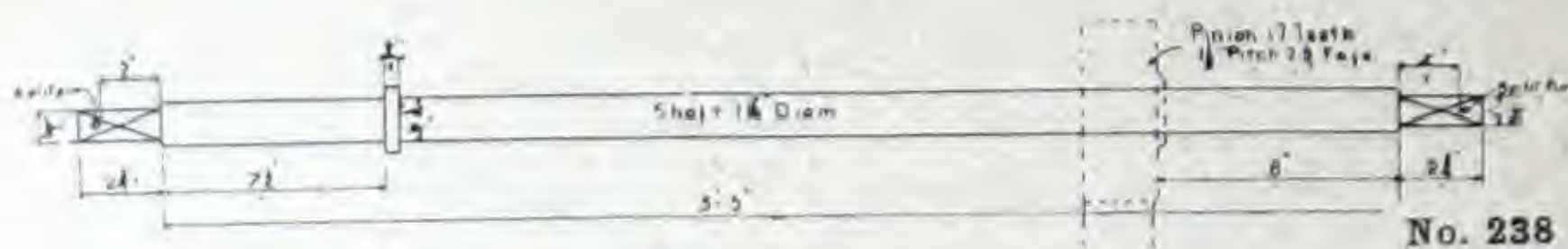
We furnish all the iron work for Scotch Derricks including Crab Winches. Write for prices stating what size you want.

Besides the Scotch Derricks and Stiff Leg Derricks illustrated in this catalogue we furnish ironwork for all other kinds of Contractors' and Builders' Derricks. We have also made up special Derricks of steel angles latticed for steel erection and other heavy work.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

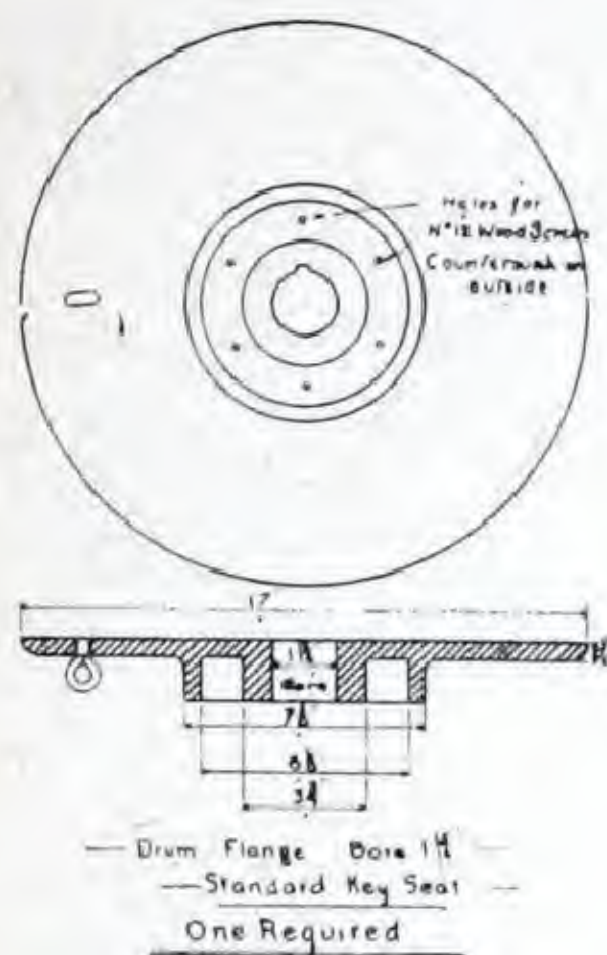
Contractors' Supplies — *Continued*

DERRICK WINCH OR CRAB

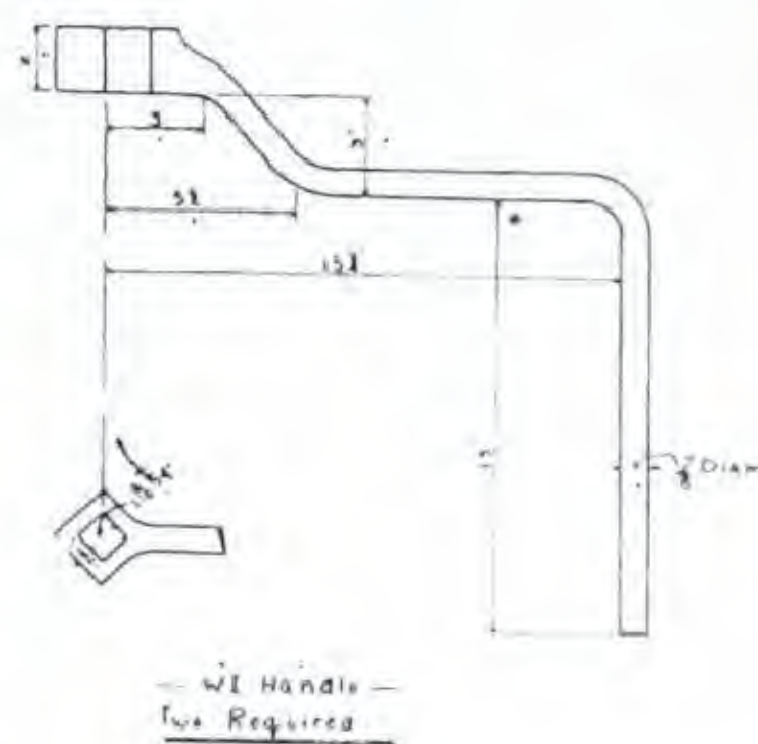


Contractors' Supplies — *Continued*

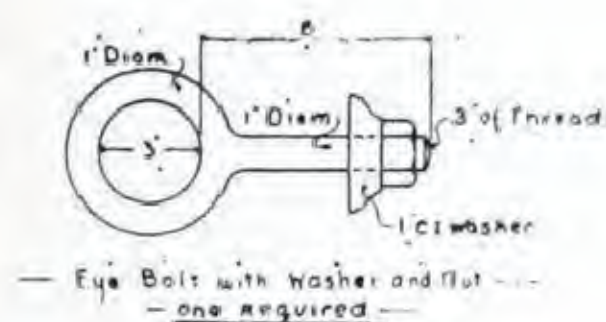
DERRICK WINCH OR CRAB



No. 242

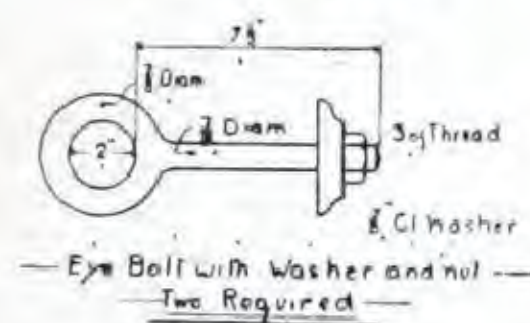
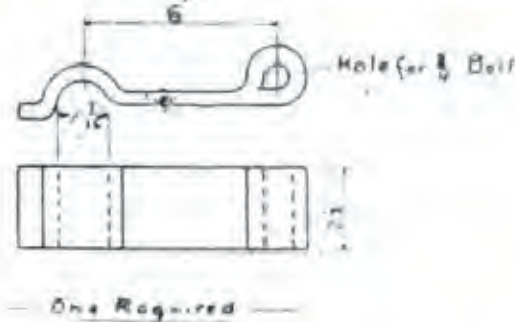


No. 243

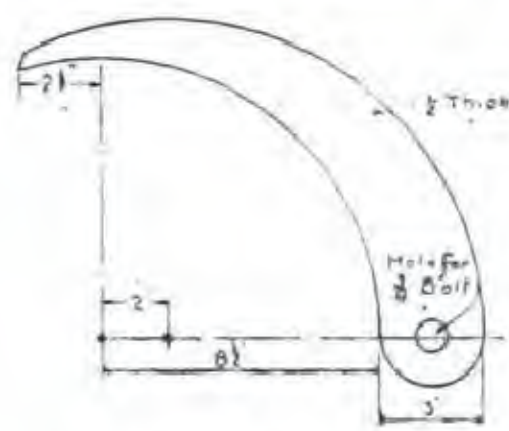


No. 244

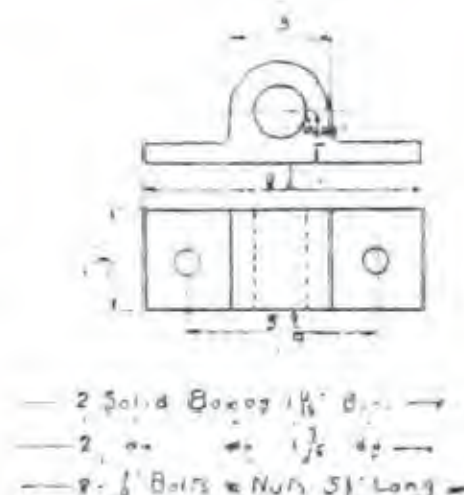
No. 215



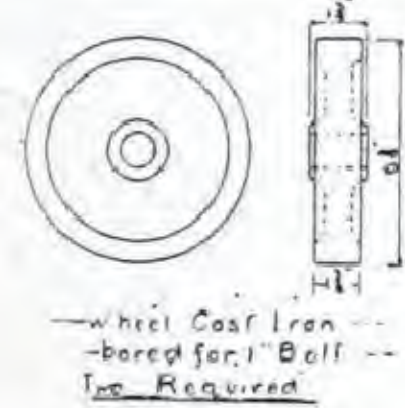
No. 247



No. 248



No. 248



2 1" Bolts and Nuts 3 1/2" Long
2 Pressed Washers for 1" Bolt

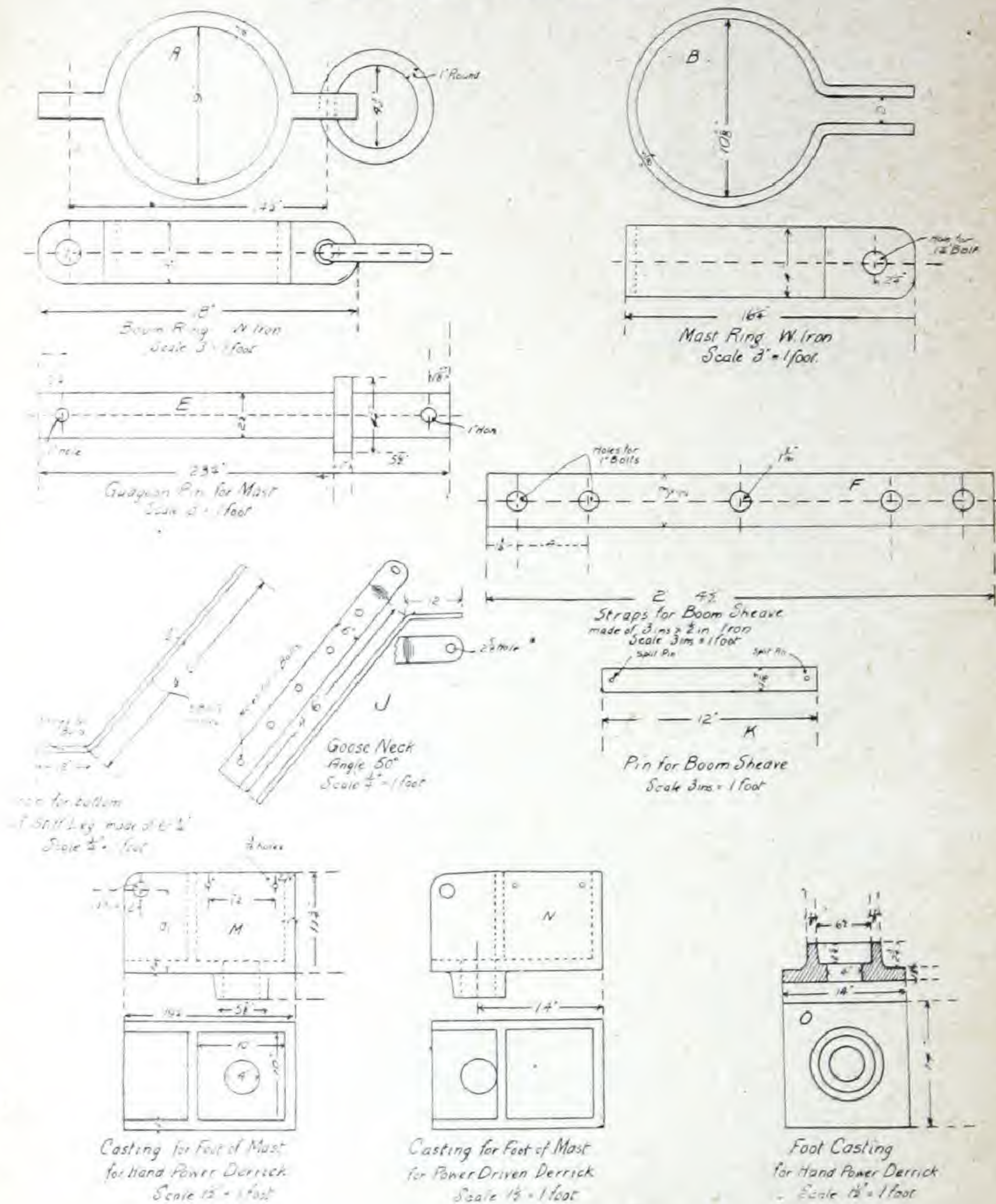
No. 249

Illustrations Nos. 238 to 249 show a complete set of irons for a hand power crab or winch for a Contractor's Derrick, to be used with wooden drum, 24 inches long. Price complete ready for assembling, not including drum, \$70.00. If iron drum is required instead of wood, add \$5.00 to above price. Drum can be made any length. We make these crabs of all patterns—single or double purchase, single or double drum, also with or without cast iron sides. Write for prices, giving full particulars of what you require.

When ordering or asking for prices, read carefully 'Instructions to Buyers' on page 216

Contractors' Supplies — Continued

STIFF LEG DERRICKS



No. 250

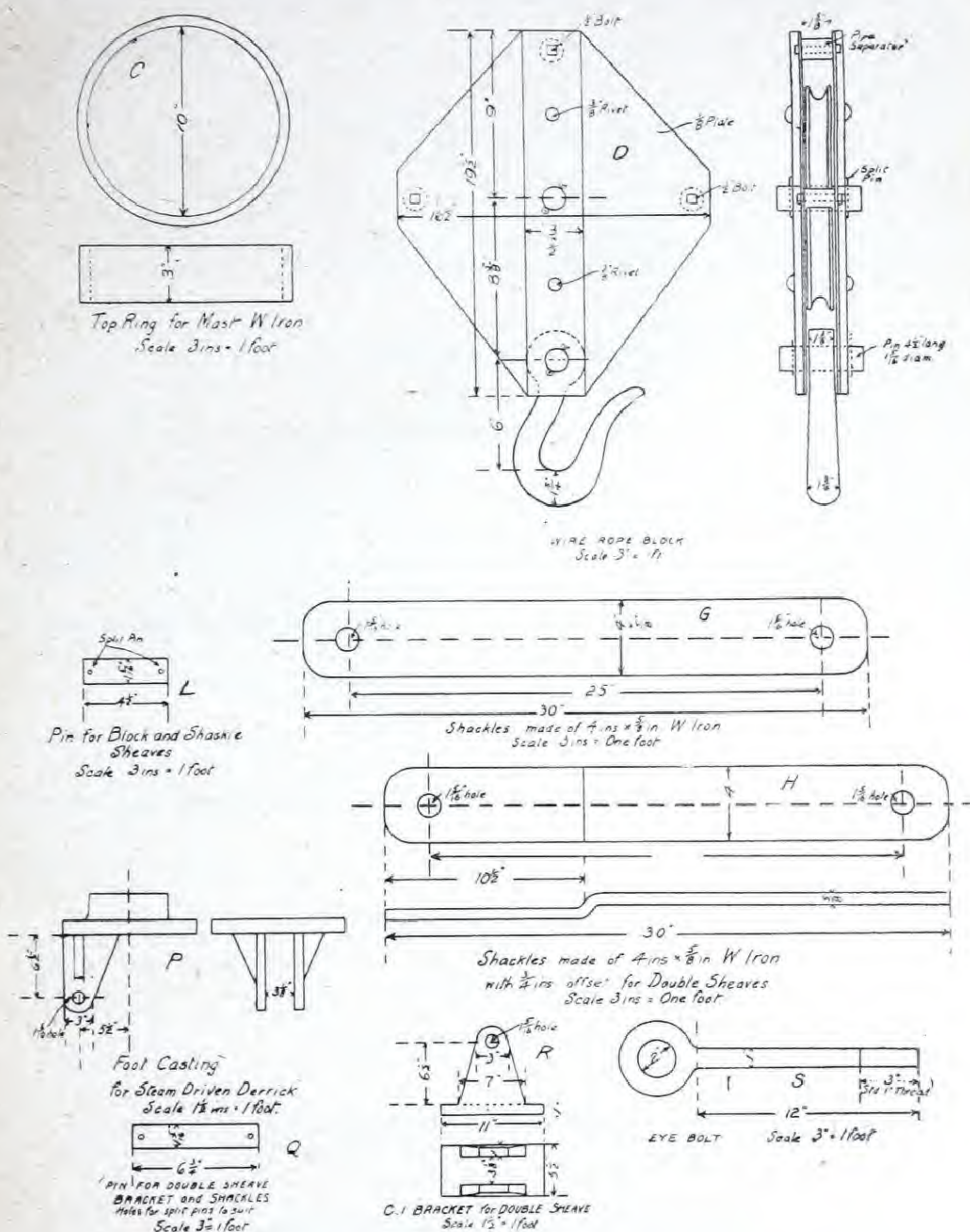
Standard Stiff Leg Derricks, Hand or Steam Power, Illustrations Nos. 250 and 251 show the iron parts for these derricks, all of which we manufacture. Following are lists showing where the various parts are used. Prices are also given. Winch for Hand-Power Derrick illustration on pages 118 and 119.

When ordering state exactly what type of Derrick is required and give fullest information possible.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Contractors' Supplies — Continued

STIFF LEG DERRICKS



No. 251

For description, etc., see following pages, 122 and 123.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Contractors' Supplies — *Continued*STIFF LEG DERRICKS
PRICES AND SPECIFICATIONS

A.

Hand power Stiff Leg Derrick, with double shackle for raising and lowering boom.

- 1 Boom ring A.
- 1 Mast ring B.
- 1 Mast ring C.
- 1 Wire rope block complete (12 inch sheave) D.
- 1 Gudgeon E.
- 6 Straps for mast and boom sheaves F.
- 1 Set of shackles for single sheave G.
- 1 Set of shackles for double sheave H.
- 2 Irons for bottom of stiff legs when ordered only, I
- 2 Goose Necks, J.
- 3 Pins for boom sheave, K.
- 1 Pin with cotter pins for single sheave shackle, L.
- 1 Casting for foot of mast, M.
- 1 Foot casting, O.
- 1 Pin with cotter pins, for double sheave shackle, Q.
- 1 Eye bolt, S.
- 10 1 inch bolts, 10 inches between head and nut for goose necks.
- 8 1 inch bolts, 10 inches between head and nut for mast sheave straps.
- 4 1 inch bolts, 10 inches between head and nut, for boom sheave straps.
- 2 $1\frac{1}{4}$ inch bolts, $2\frac{3}{4}$ inches between head and nut with split pins for shackles.
- 2 $\frac{3}{4}$ inch bolts, 12 inches between head and nut for foot of mast.
- 1 Pce. $1\frac{7}{8}$ inch shafting, 14 inches long, with $\frac{1}{2}$ inch cotter pin each end
- 6 12 inch sheave wheels, bore $1\frac{5}{8}$ inch.
- 4 $\frac{3}{4}$ inch bolts, $11\frac{1}{2}$ inches between head and nut for foot casting.
- 1 Crab complete as illustrated on pages 120 and 121.

Price, \$140.00. Without Crab \$75.00.

B

Hand power stiff leg derrick, with single shackle for raising and lowering boom.

- 1 Boom ring, A.
- 1 Mast ring, B.
- 1 Mast ring, C.
- 1 Wire rope block complete (12 inch sheave) D.
- 1 Gudgeon, E.
- 6 Straps, for mast and boom sheaves, F.
- 1 Set shackles for single sheaves, G.
- 2 Irons for bottom of stiff legs when ordered only, I.
- 2 Goose necks for boom sheave, J.
- 3 Pins for boom sheave, K.
- 1 Pin with cotter pins, for single sheave shackle, L.
- 1 Casting for foot of mast, M.
- 1 Foot casting, O.
- 1 Eye Bolt, S.
- 10 1 inch bolts, 10 inches between head and nut, for goose necks.
- 8 1 inch bolts, 11 inches between head and nut, for mast sheave straps.
- 4 1 inch bolts, 10 inches between head and nut, for boom sheave straps.
- 1 $1\frac{1}{4}$ inch bolts, $2\frac{3}{4}$ inches between head and nut with split pin for shackle.
- 1 $1\frac{1}{4}$ inch bolt, $1\frac{1}{4}$ inches between head and nut, for mast ring.
- 2 $\frac{3}{4}$ inch bolts, 12 inches between head and nut for foot of mast.
- 1 Pce. of $1\frac{7}{8}$ inch shafting, 14 inches long with $\frac{1}{2}$ inch cotter pin each end.
- 4 $\frac{3}{4}$ inch bolts, $11\frac{1}{2}$ inches between head and nut for foot casting.
- 4 12 inch sheave wheels, bore $1\frac{5}{8}$ inch.
- 1 Crab complete as illustrated on pages 120 and 121.

Price, \$170.00. Without Crab, \$80.00.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Contractors' Supplies—*Continued*

STIFF LEG DERRICKS

PRICES AND SPECIFICATIONS

C.

Steam power stiff leg derrick, with double shackle for raising and lowering boom.

- 1 Boom ring, A. 1 Mast ring, B. 1 Mast ring, C.
- 1 Wire block complete (12 inch sheave), D.
- 1 Gudgeon, E.
- 2 Straps for boom sheave, F.
- 1 Set shackles, for single sheaves, G.
- 1 Set shackles, for double sheaves, H.
- 2 Irons for bottom of stiff legs, when ordered only, I.
- 2 Goose necks, J.
- 1 Pin with cotter pins for boom sheave, K.
- 1 Pin with cotter pins for single sheave and shackle, L.
- 1 Casting for foot of mast, N.
- 1 Foot casting, P.
- 1 Pin with cotter pins, with double sheave shackle, Q.
- 1 Double sheave bracket, R.
- 1 Eye bolt, S.
- 10 1 inch bolts, 10 inches between head and nut, for goose necks.
- 4 1 inch bolts, 10 inches between head and nut for boom sheave straps.
- 2 $1\frac{1}{4}$ inch bolts, $2\frac{3}{4}$ inches between head and nut with split pin for shackle.
- 2 $\frac{3}{4}$ inch bolts, 12 inches between head and nut, for foot of mast.
- 1 Pce. $1\frac{7}{16}$ inch shafting, 14 inches long with $\frac{1}{2}$ inch cotter pin each end.
- 8 12 inch sheave wheels, bore $1\frac{5}{16}$ inch.
- 4 $\frac{3}{4}$ inch bolts, 11 inches between head and nut for sheave bracket.

Price, \$88.00.

D.

- 1 Boom ring, A. 1 Mast ring, B. 1 Mast ring, C.
- 1 Wire rope block complete (12 inch sheave), D.
- 1 Gudgeon, E.
- 2 Straps for boom sheave, F.
- 1 Set shackles for single sheave, G.
- 2 Irons for bottom of stiff leg, when ordered only, I.
- 2 Goose Necks, J.
- 1 Pin with cotter pins for boom sheave, K.
- 1 Pin with cotter pins, for single sheave shackle, L.
- 1 Casting for foot of mast, N.
- 1 Foot Casting, P.
- 1 Double sheave bracket, R.
- 1 Eye bolt, S.
- 10 1 inch bolts, 10 inches between head and nut, for goose necks.
- 4 1 inch bolts, 10 inches between head and nut, for boom sheave straps.
- 1 $1\frac{1}{4}$ inch bolts, $2\frac{3}{4}$ inches between head and nut with split pin, for shackle.
- 1 $1\frac{1}{4}$ inch bolt, $1\frac{1}{4}$ inches between head and nut, for mast ring.
- 2 $\frac{3}{4}$ inch bolts, 12 inches between head and nut, for foot of mast.
- 1 Pce. $1\frac{7}{16}$ inch shafting, 14 inches long, $\frac{1}{2}$ inch cotter pin each end.
- 4 $\frac{3}{4}$ inch bolts, 11 inches between head and nut for sheave and bracket.
- 6 Sheave wheels, 12 inches diameter, bore $1\frac{5}{16}$ inch.

Price, \$100.00.

E.

Guy derrick made in either A, B, C or D style, only goose neck and stiff leg irons not required.

Guy casting for top of mast required.

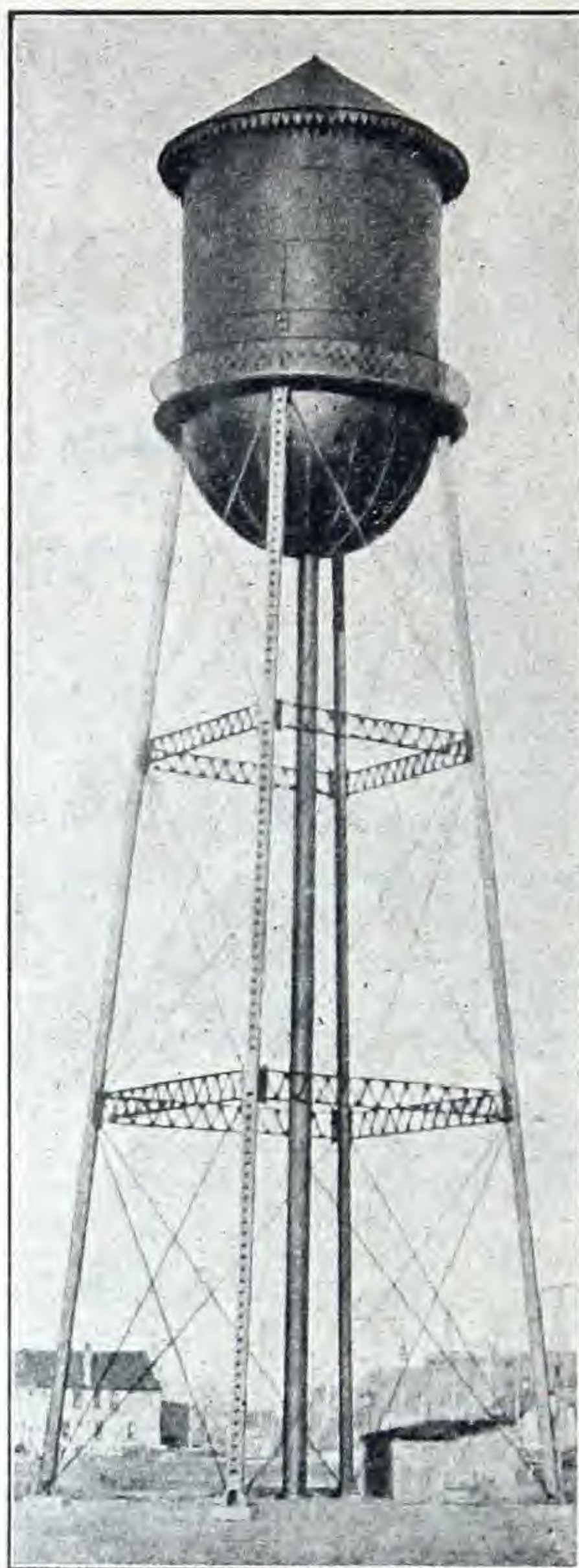
Price with crab, \$146.00. Without crab, \$85.00.

Crab as illustrated on pages 118 and 119 (hand-power.)

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous

STEEL TANK AND TOWER



No. 252

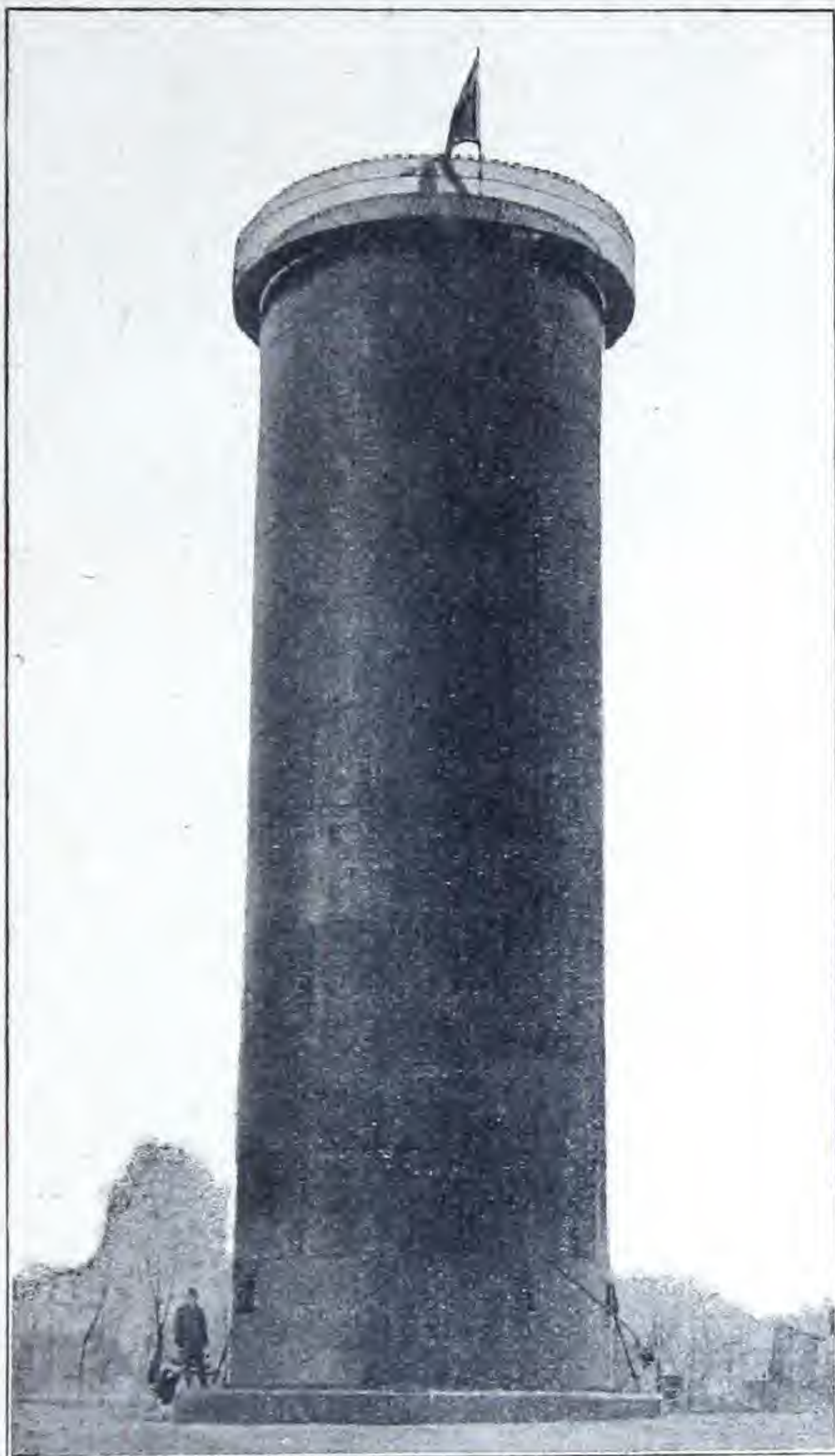
Water Supply Tanks and Towers of any height or capacity for municipalities or corporations. We also furnish steel towers for supporting wooden tanks. We do not manufacture wooden tanks.

We will design Tanks and Towers and give estimates of cost to prospective buyers without charge. When writing send all particulars covering height of tower and capacity of tank,

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

STEEL STAND PIPES



No. 253

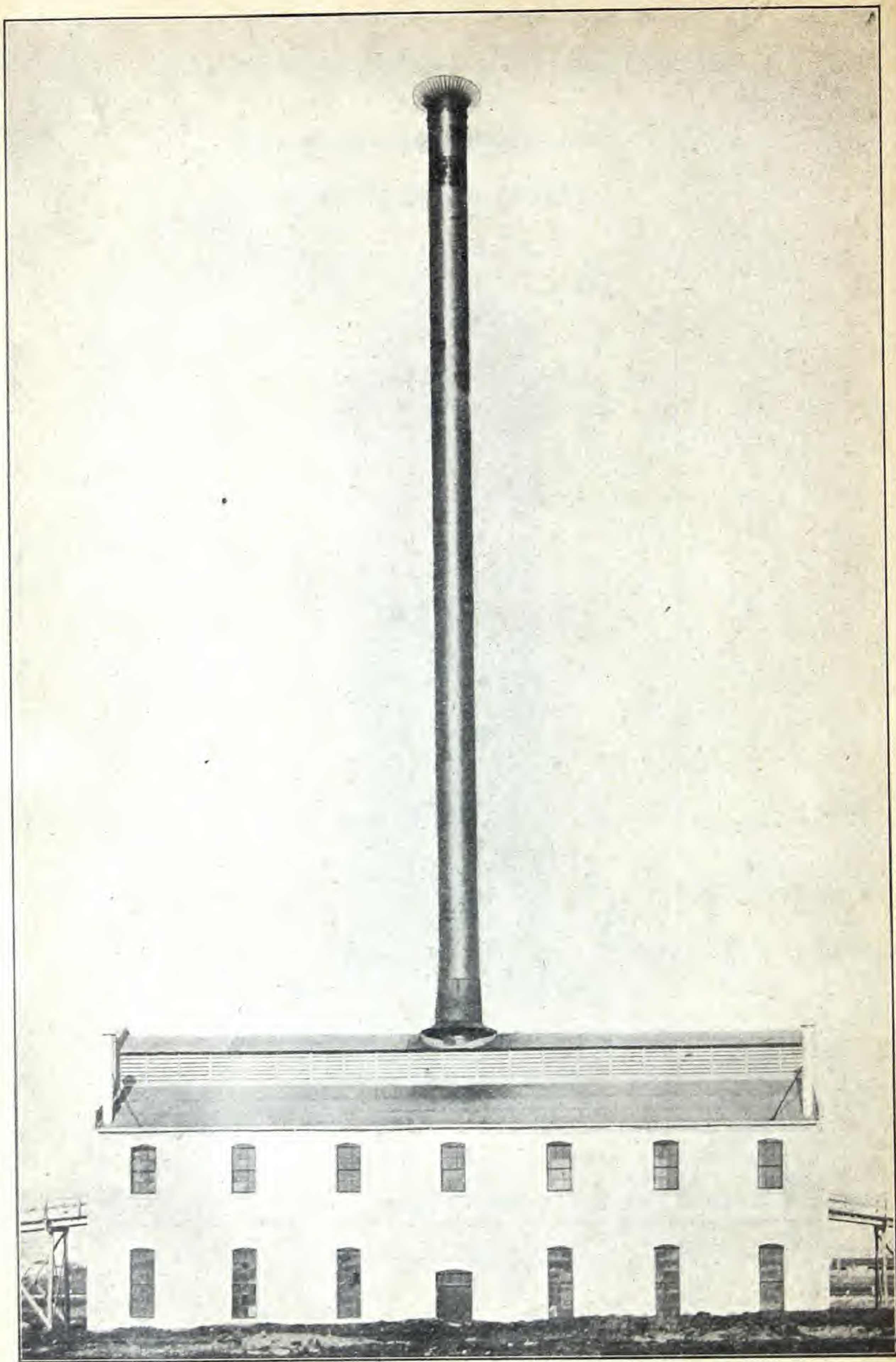
We design and manufacture Steel Stand Pipes of any capacity for water supply systems. Drawings and estimates of cost will be furnished without charge to prospective buyers. When writing for estimates state height and capacity.

The Stand Pipe shown above was made and erected by us for Portage la Prairie, Manitoba.

TANKS

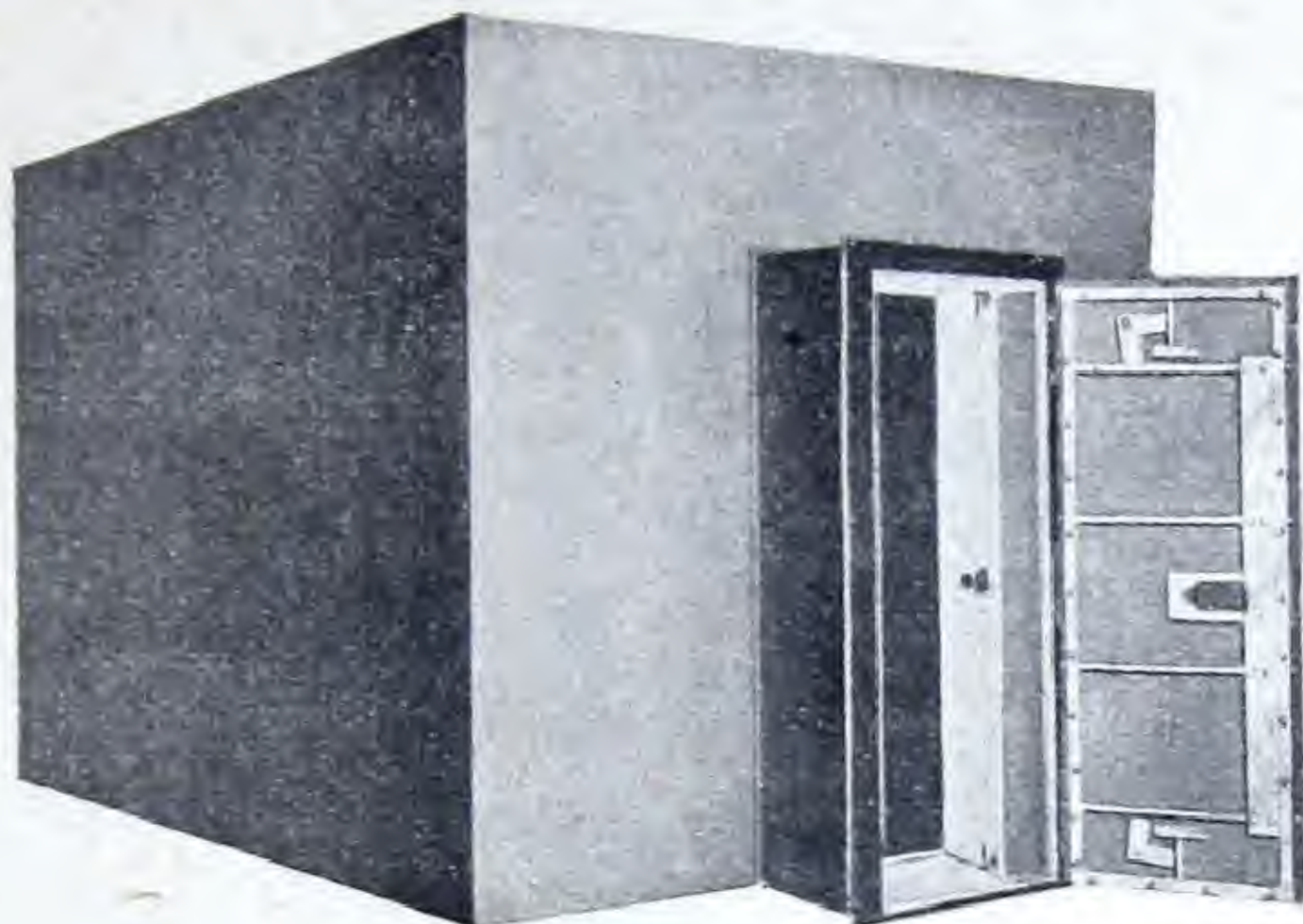
Besides Stand Pipes, we manufacture Steel Tanks of every description, all sizes, any thickness of plate, $\frac{1}{8}$ inch to 1 inch. We make water tight or air tight tanks. Send specifications for prices.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216



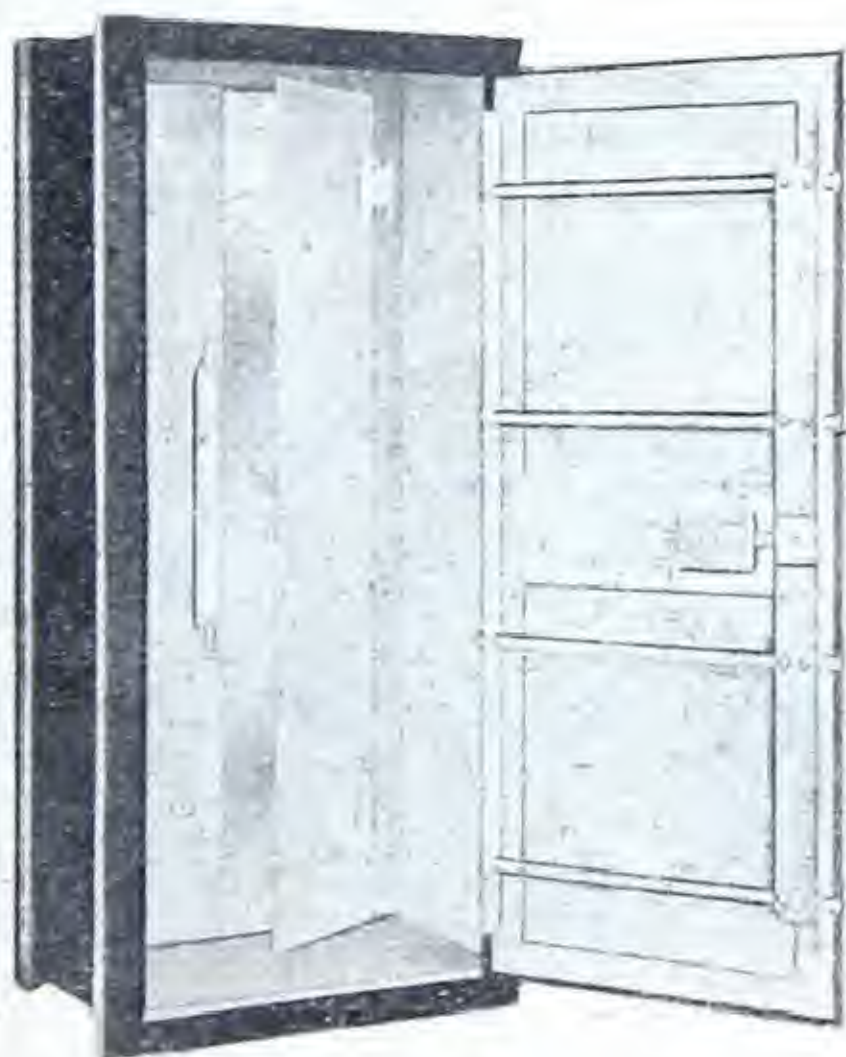
No. 254—Steel Stack, 7 feet diameter, 200 feet high. Highest Steel Stack in Western Canada.
Steel Smoke Stacks of any size or style made to order. Designs and Estimates of cost furnished without charge to our customers. When writing, send sketch showing all dimensions and thickness of plate required.
The above illustration shows the Stack made and erected by us, at Winnipeg Incinerator.

Miscellaneous — *Continued*
STEEL VAULTS AND VAULT DOORS



No. 255

No. 255 shows steel plate lining for a Vault. Banks, Trust Companies and many Lawyers require steel lining for vaults in which money and important papers are kept. The thickness of the plate varies from $\frac{1}{4}$ in. to 1 in. We make these steel vaults of any size, style, and thickness of plate. All work is riveted and joints are properly finished. Steel shelves can be constructed inside the vault. As this is special work prices will be given on application. When writing specify all dimensions, size of door opening and thickness of plate wanted, also if steel floor is required. These vaults are shipped "Knocked Down" all parts plainly marked, drilled for rivets.



No. 256

We do not manufacture Vault Doors, but we sell as agents all sizes and makes, either vestibuled (steel lined), as shown by No. 256 or door and frame alone. Prices and shipping weights on application. When writing give dimensions of opening and state if vestibuled doors are wanted.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*
STEEL TOWERS



No. 257—Steel Towers for carrying transmission circuits, made to order, any design.

No. 257 shows a standard transmission Tower of which 850 were made for the City of Winnipeg, in 1909. These Towers are located between Winnipeg and Point du Bois, and carry high tension electric circuits from the main generating station to transformer station, in Winnipeg, a distance of 80 miles.

Extract from Winnipeg *Free Press*,—Consulting Engineer's Report :

"Prof. Herdt, William Kennedy, Jr. and H. N. Ruttan, consulting engineers, reported as follows: "In connection with the transmission towers, at our request a practical test of a full sized tower was made on Thursday, at the Manitoba Bridge and Iron Works. The test showed that the DESIGN AND CONSTRUCTION of the tower were satisfactory."

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

FARMER'S ANVILS



No. 258

An anvil is an indispensable adjunct to every farmer's repair equipment.

We furnish anvils shown by No. 258, in several sizes, made from the best Bessemer steel.

PRICES, WEIGHTS AND SIZES

NO.	LENGTH	HEIGHT	WIDTH OF TOP FLANGE	WEIGHT	PRICE
1	18 inches	8 inches	4 inches	27 lbs.	\$1.08
2	18 inches	10 inches	4½ inches	40 lbs.	1.60
3	18 inches	12 inches	5 inches	60 lbs.	2.40
4	18 inches	15 inches	6 inches	70 lbs.	2.80
5	18 inches	18 inches	6½ inches	90 lbs.	3.60

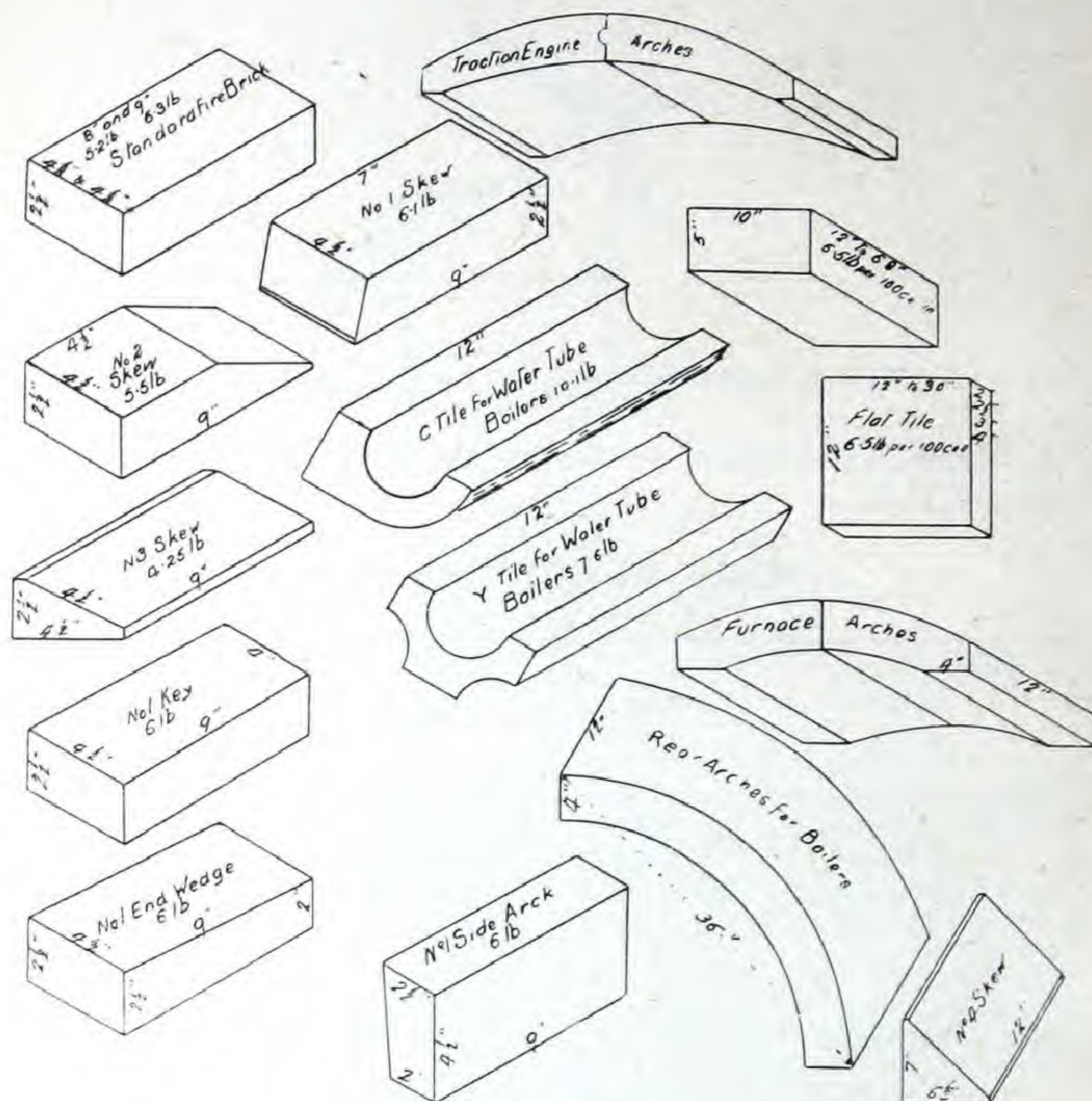
Any other sizes or weights wanted will be furnished. Write for discounts.

FARMER'S MISCELLANEOUS EQUIPMENT

Besides anvils as shown above many other articles are manufactured by us and sold to farmers throughout the country. Some of them are as follows: Saw Tables, Logging Chains, Cast Iron Mauls, all kinds of Water Tanks for cattle, horses, pigs, sheep, etc., Dairy Tanks, Steel Towers for windmills, Cast Iron Fence Posts, Iron fixtures for Barns, Stables, also Sleigh Shoes, Iron work for Heavy Wagons, Land Rollers, General repairs of Machinery, etc., etc.

Miscellaneous — Continued

FIRE BRICK



No. 259

The above illustrations show several styles of Fire Brick as manufactured for various purposes, all of which we sell. The Standard Fire Brick we carry in stock.

SIZES AND PRICES

8 in. x 2 1/2 in. x 4 1/2 or 4 1/2 in.	Weight 5.9 lbs. each	Price per 1000	\$36.00
9 in. x 2 1/2 in. x 4 1/2 or 4 1/2 in.	Weight 6.3 lbs. "	" " " "	39.00

Above prices are for small lots (less than car loads). In car loads prices are \$33.00 per 1,000 for the 8 in. and \$36.00 for the 9 in. Write for discounts.

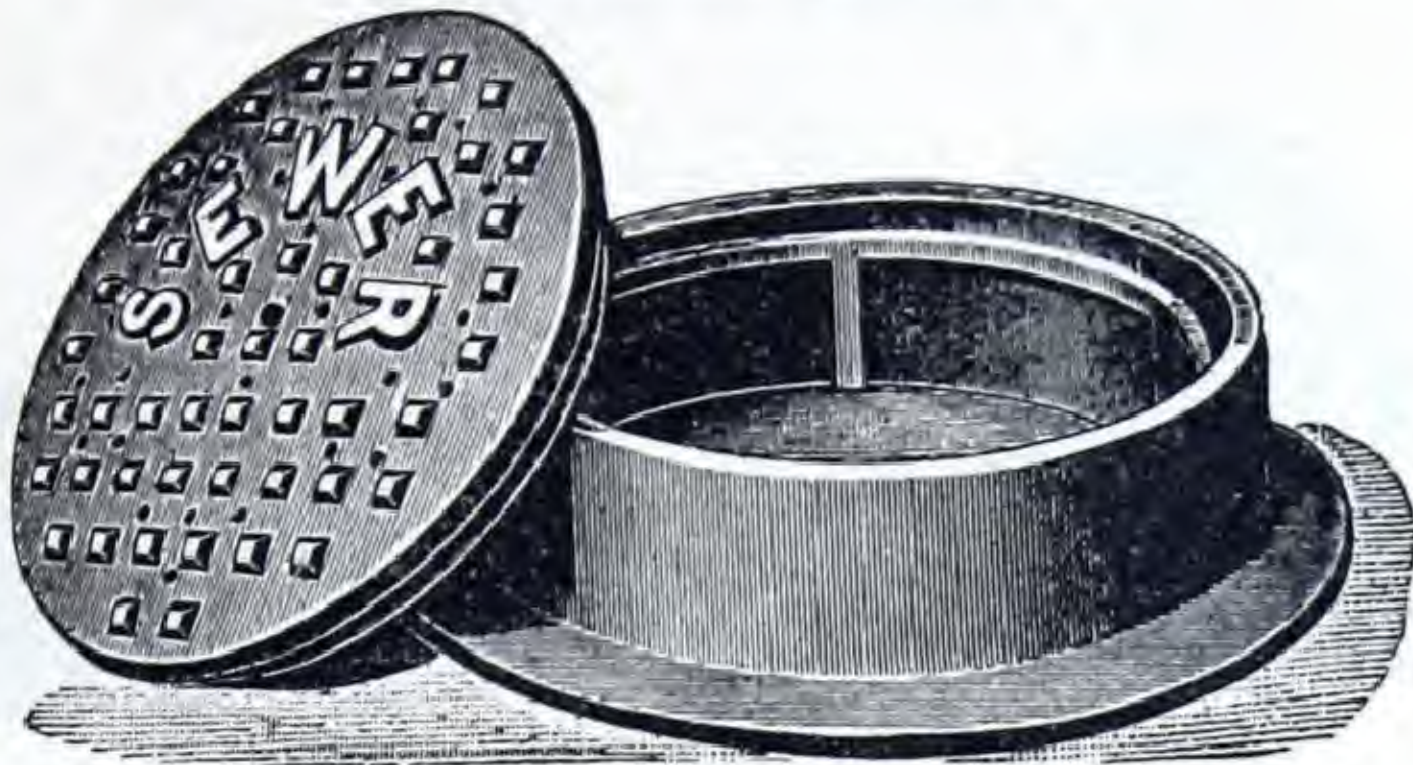
FIRE CLAY

Furnished in sacks of 200 lbs. each, at \$18.00 per ton in small lots (less than car loads) and \$16.00 per ton in car loads. Write for discounts.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

SEWER MANHOLE COVER



No. 260

We manufacture all patterns of cast iron manhole covers for sewer systems, also curb inlets, catch basin covers, lamphole covers, gratings, mud pans, manhole steps, and in general all ironwork required for sewer construction. We have a great variety of patterns in stock from which to make the castings, and can fill your order at low cost.

When writing for prices give dimensions and lettering of castings wanted.

SASH WEIGHTS



No. 261

Standard round, solid, $1\frac{3}{4}$ in. diameter, cast iron Sash Weights, any weight.

We have recently installed special machinery for making sash weights and consequently have been able to reduce the prices. Our machines make the weights as shown by No. 261, having a diameter of $1\frac{3}{4}$ inches. The weights shown are "solid." We also make "sectional" weights. Prices are now \$2.00 per 100 lbs. for all weights of $1\frac{3}{4}$ inches diameter, 3 pounds in weight and over; \$2.25 per 100 lbs. for weights of less than 3 lbs. We also make sash weights of any other diameter wanted, and of any size or shape, at slightly higher prices.

Our facilities for manufacturing sash weights are exceptional, and we sell large numbers of them in Winnipeg and throughout Western Canada. Send list of sizes wanted and we will quote you prices.

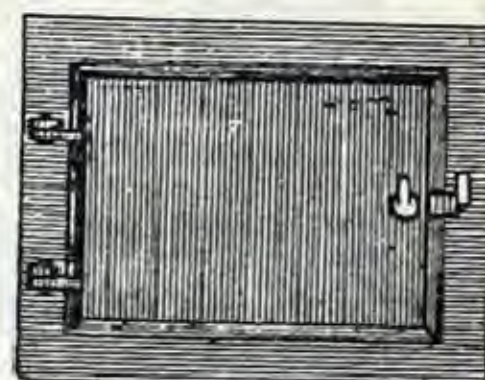
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

CLEAN OUT DOORS



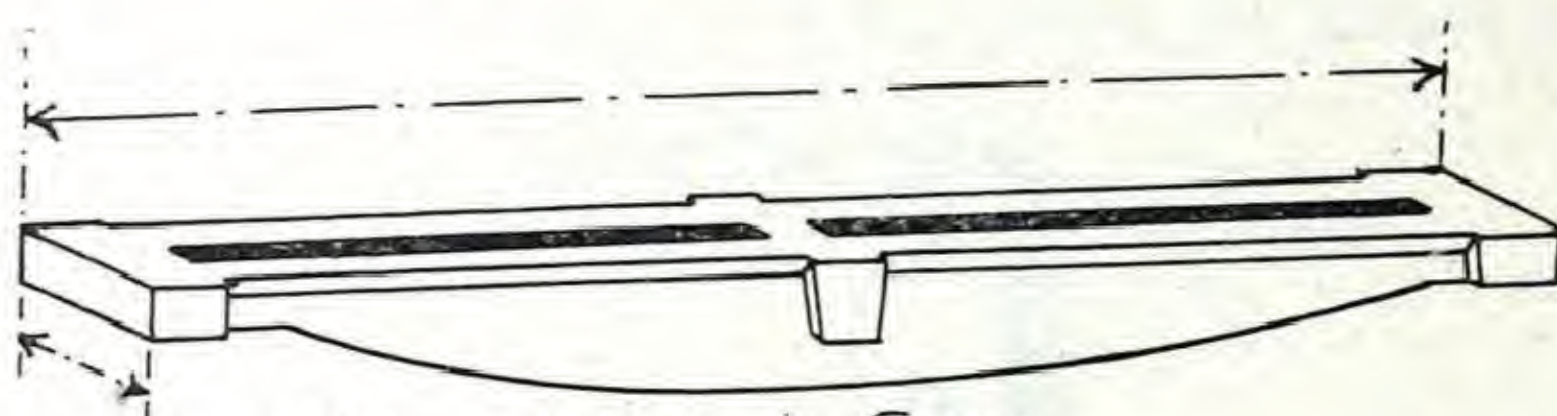
No. 262 — Clean out Door, circular head. Any size.



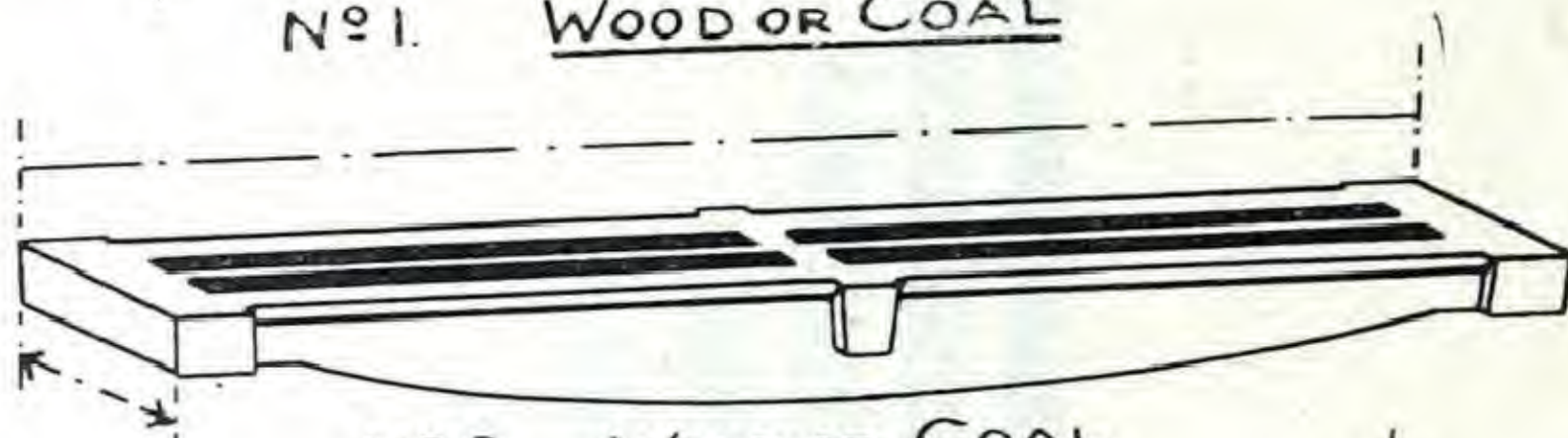
No. 263 — Clean out Door, rectangular, hinged. Any size.

Write for prices, stating size of opening.

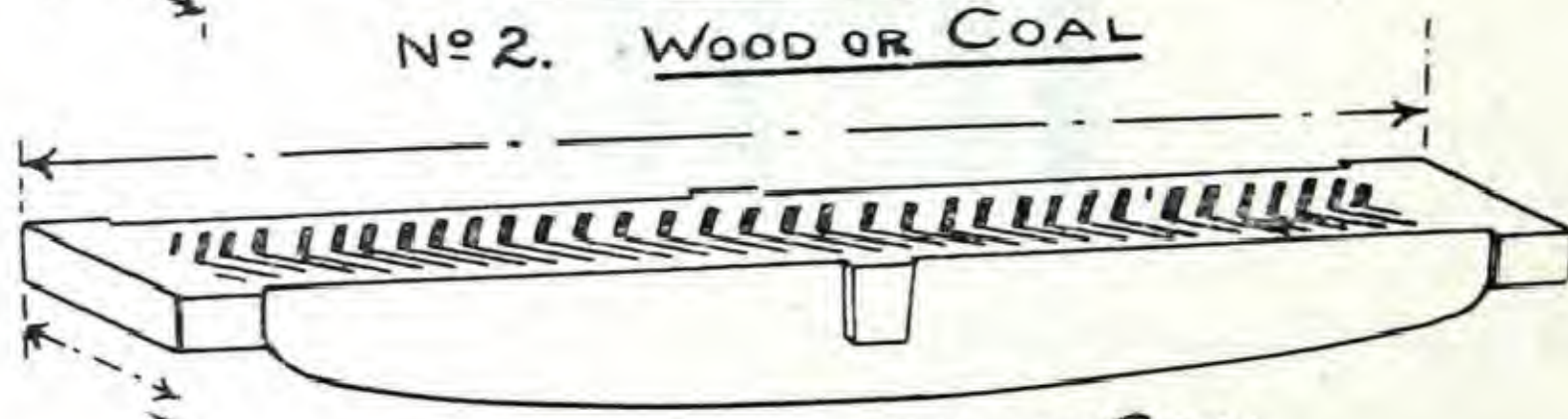
FURNACE GRATES



No. 1. WOOD OR COAL



No. 2. WOOD OR COAL



No. 3 HERRING BONE COAL

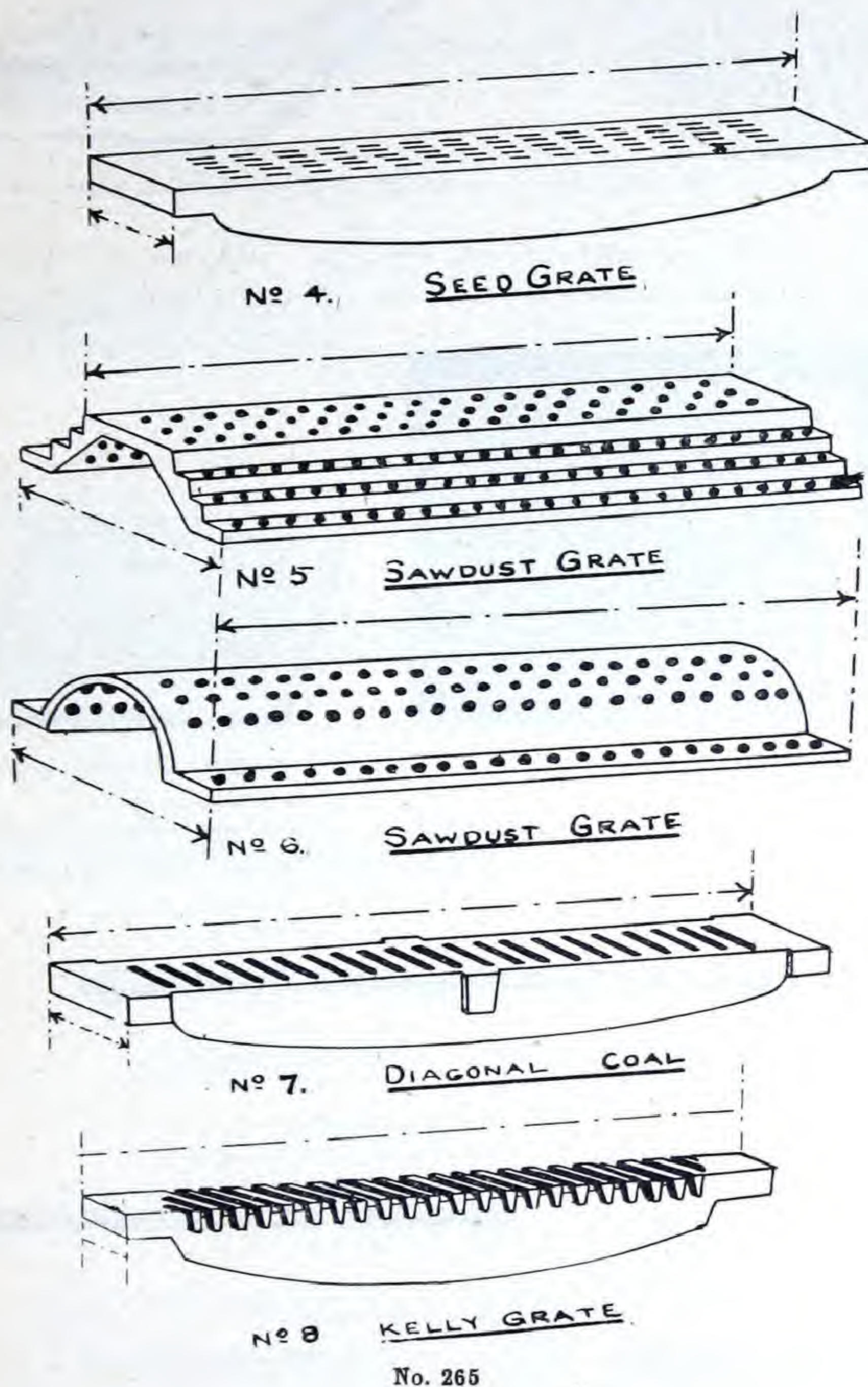
No. 264

There are many styles of furnace grates in use. Illustration No. 264 and 265, pages 132 and 133, show some of them. We have a great variety of patterns of all sizes on hand. Write for prices, giving dimensions and style wanted. Our prices on these grates are very close, and we sell hundreds of them every year.

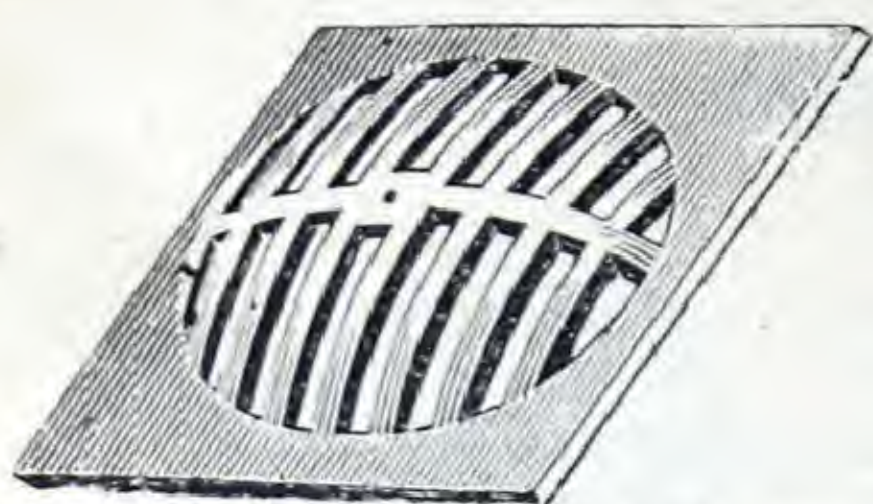
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

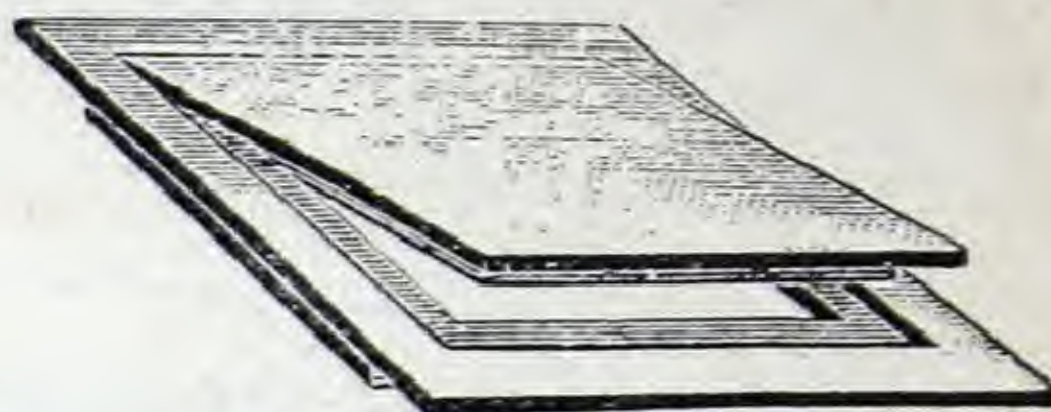
FURNACE GRATES



Miscellaneous — Continued

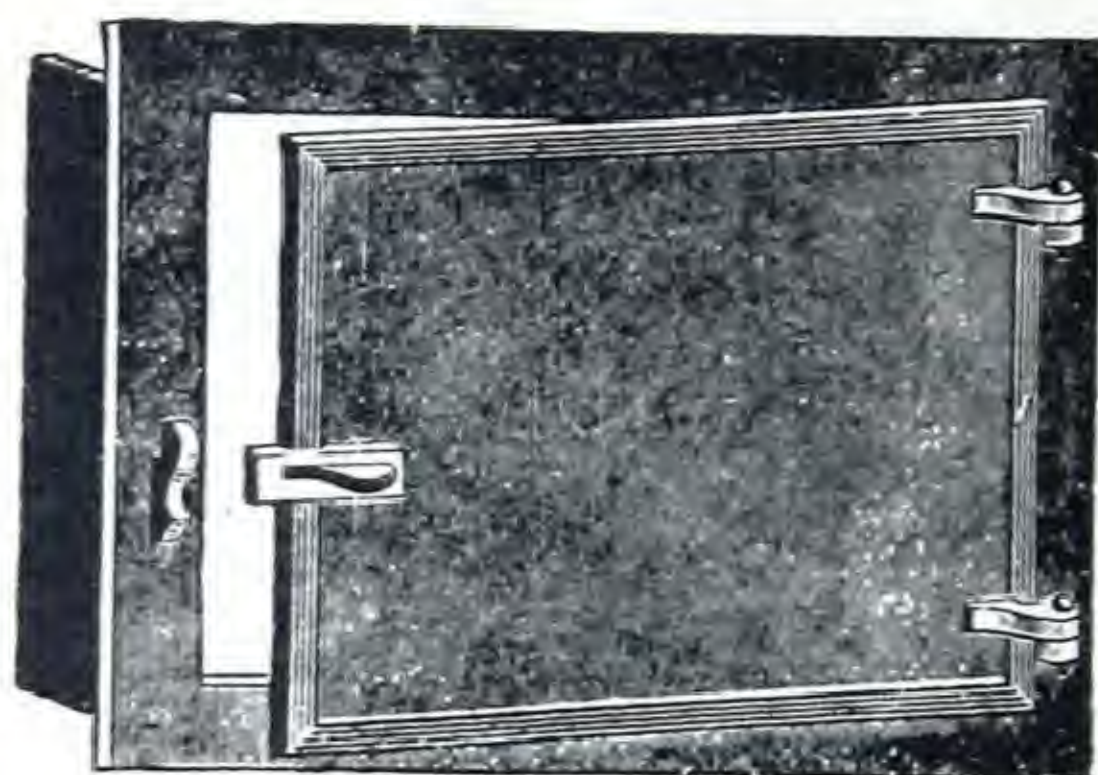


No. 266—Cast iron Sidewalk Grating.

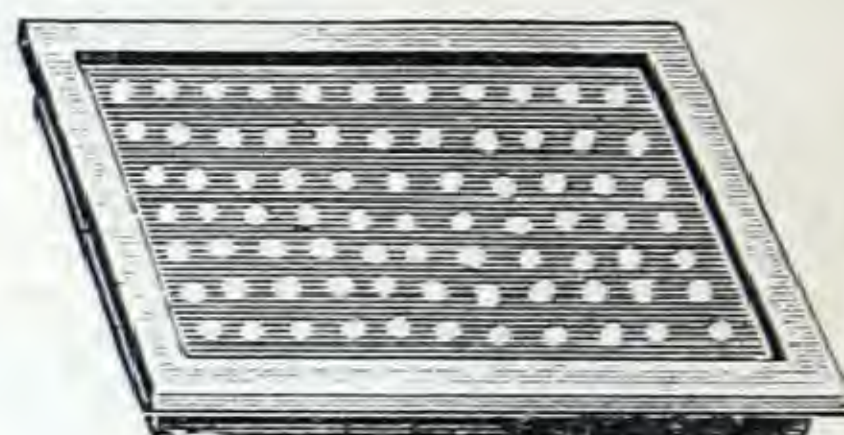


No. 267—Cast iron Sidewalk opening with Door.

Cast Iron Gratings and Sidewalk Openings. All sizes and styles made to order. Give dimensions when ordering. Prices on application.



No. 268—Cast iron Furnace Doors.

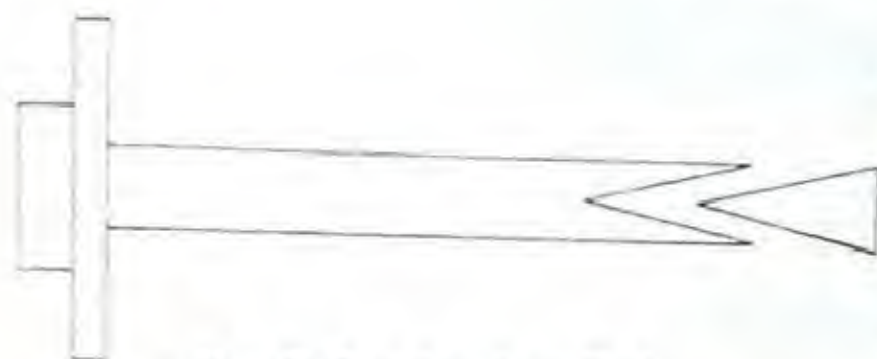


No. 269—Cast iron Grating.

Cast Iron Furnace Doors or similar doors for other purposes, see No. 268 can be made up, any size or shape. Send dimensions with short description of what is wanted, when prices will be quoted.



No. 270—Tie Rod for I-Beams.



No. 271—Anchor Bolt.



No. 272—Foundation Bolt.

We make all sizes and styles of anchor and foundation bolts, also tie rods, as shown by Nos. 270, 271 and 272. Prices on application. State diameter of bolt, kind of washer, kind of nut and length of thread wanted when ordering, also if upset or plain ends. Unless otherwise stated plain ends will be furnished.

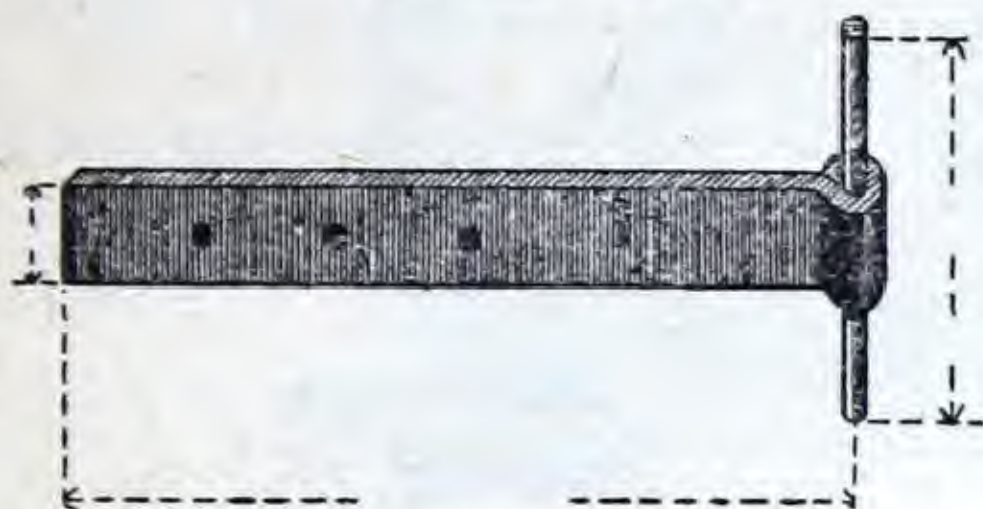
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

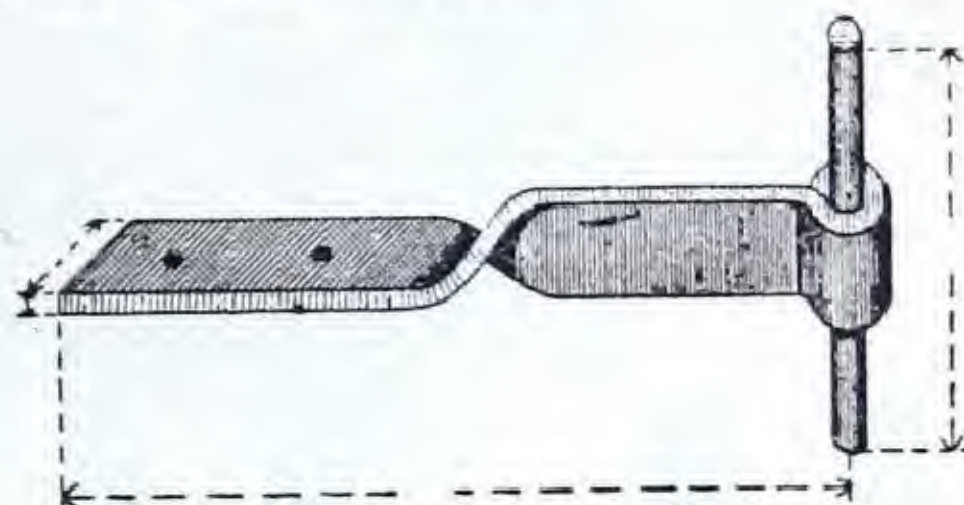
JOIST ANCHORS, JOIST TIES, DOGS, BEAM ANCHORS



No. 273—Wrought iron Joist Anchor—Round face plate.



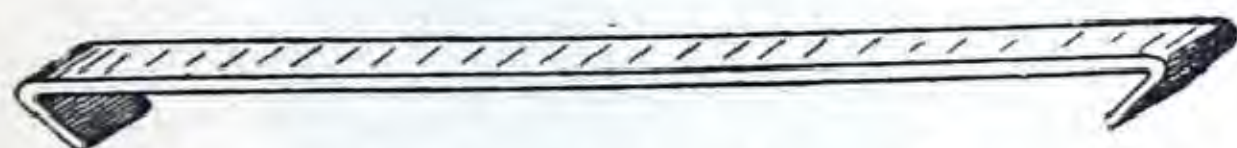
No. 274—Wrought iron Joist Anchor, with Pin. For side of Joist.



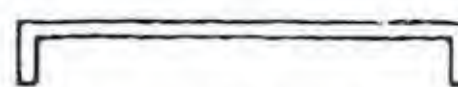
No. 275—Wrought iron Joist Anchor, with Pin. For top of Joist.



No. 276—Wrought iron Joist Anchor—Star face. Side or top of Joist.



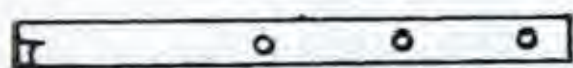
No. 277—Wrought iron I-beam Tie.



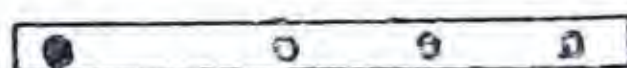
No. 278—Wrought iron Dog for connecting Joists.



No. 279—Wrought iron Pin Anchor for I-beams.



No. 280—Wrought iron Joist Anchor with split end.



No. 281—Wrought iron Joist Anchor with pin.

Illustrations No. 273 to No. 281, inclusive, show several styles of joist anchors, joist ties, beam anchors, etc., all of which we make large numbers of. Prices on application. When ordering give dimensions also number and size of holes wanted.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — Continued



No. 282—Shutter Hooks and Eyes.

Nos. 282 and 283 illustrate shutter hooks of several different styles. We make these of cast iron, and will furnish any kind required. Write for prices.

Shutter eyes are usually ordered in sets of 4 (2 right hand and 2 left hand). Unless otherwise ordered we ship half right and half left hand.

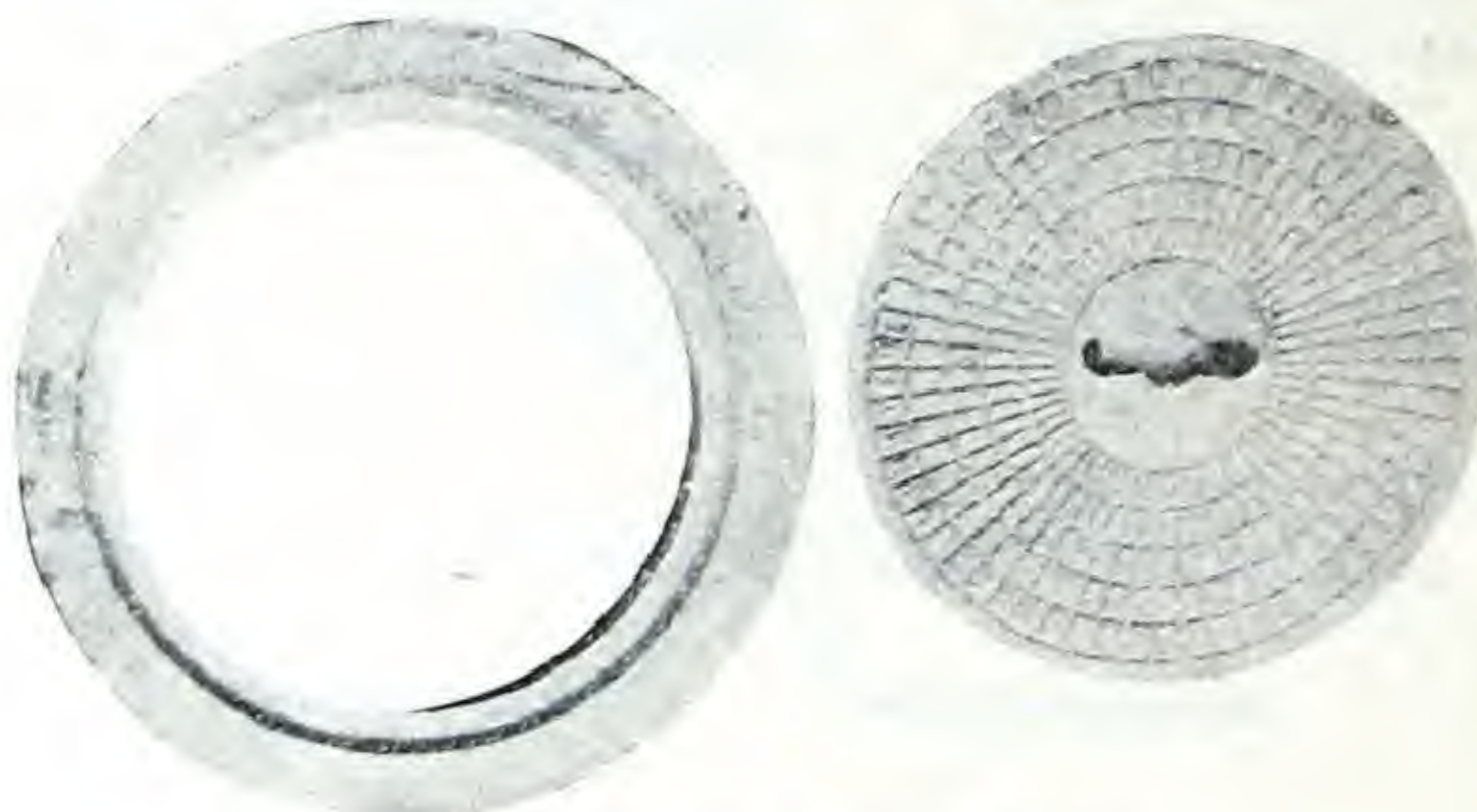


No. 283—Shutter Hooks.



No. 284—Lugs for tank hoops or rods.

No. 284 shows a lug for tank rod. These are made either of cast or malleable iron. We furnish any size required. Price on application.



No. 285—Catch Basin Frame and Cover.

We sell large numbers of Cast Iron Catch Basin Frames and Covers of all sizes. See No. 285, page 136. Following are the sizes, weights and prices, of stock covers.

SIZE	PRICE	WEIGHT
12 Inches	\$3.00	75 Pounds
18 "	4.50	112 "
24 "	6.00	160 "
30 "	11.00	280 "

We always carry 100 or so of each size in stock, as these covers are in constant demand all the year round.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

No. 286—Letter Copying Presses.

No. 286 shows a letter copying press. We manufacture and sell hundreds of these presses of all sizes and weights, and our prices are very reasonable. Send particulars as to size wanted and we will write you giving prices.



No. 287—Cast iron Tee or 3-Way connection for water pipe.



No. 288—Cast iron curved Elbow or Bend for water pipe.

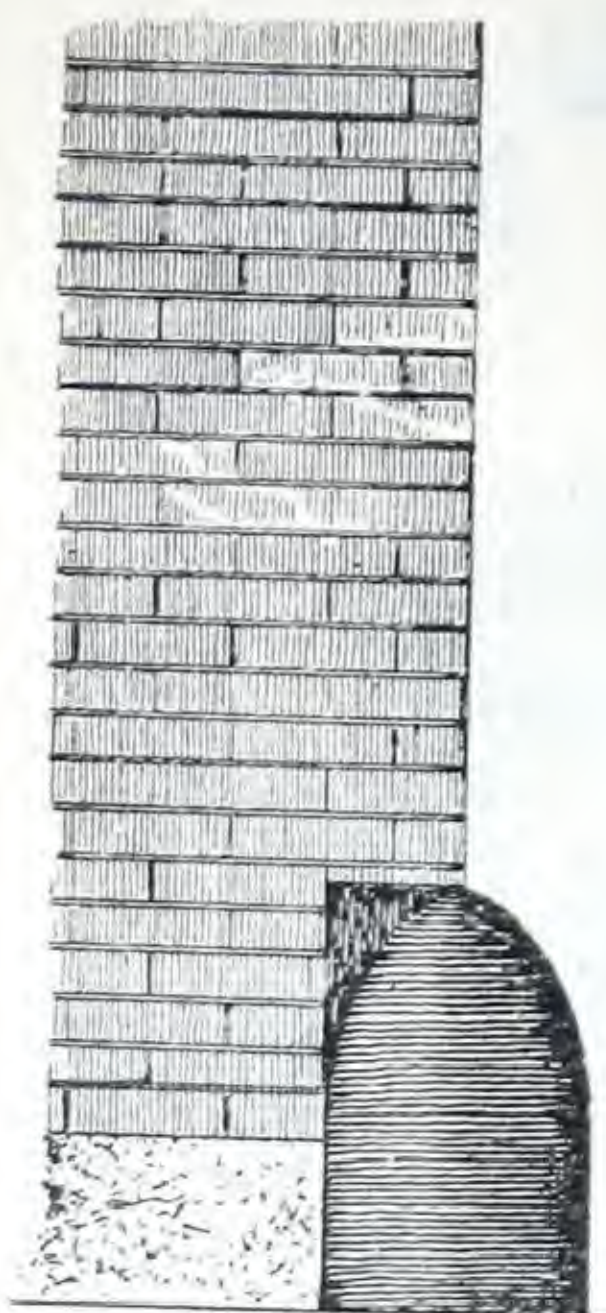
Nos. 287 and 288 illustrate cast iron specials used in connection with water mains. We do not manufacture cast iron water pipe, but we do furnish specials of all kinds, and have the patterns for Tees, Y's, bends, elbows, of many sizes and can make the castings promptly. When ordering give full particulars as to size, radius, kind of ends, etc.



No. 289 shows one form of cast iron counterweight used for balancing heavy lift doors in warehouses, freight sheds, etc. These weights are made in a great variety of sizes and shapes. They can be finished smooth and painted if required. Ask for prices.

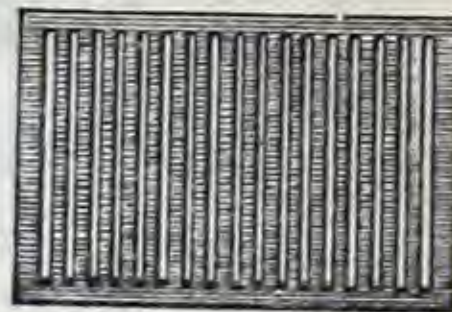
No. 289—Counterweights—Cast iron.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

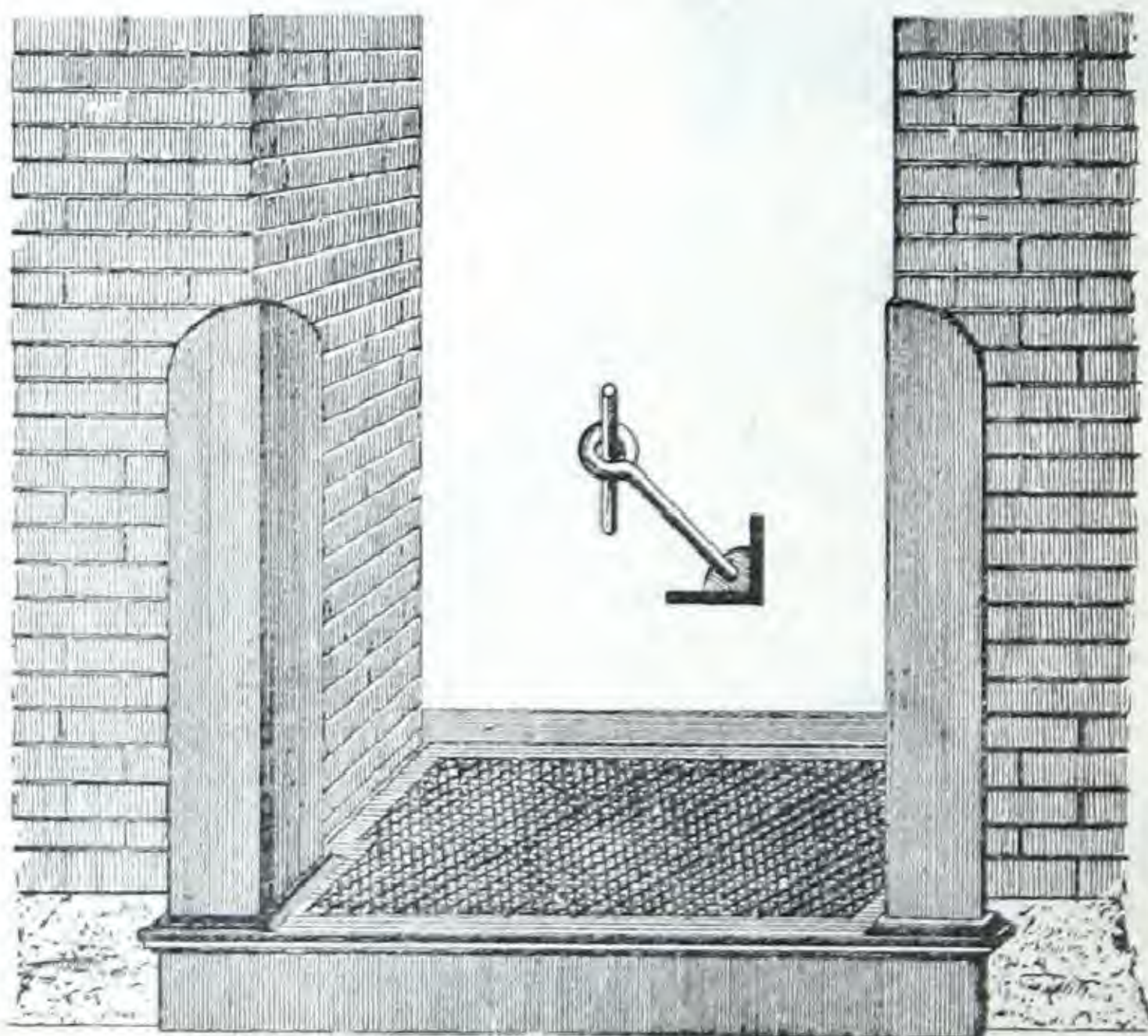
No. 291—Wheel Guard with anchor.

Wheel Guards are used to protect the walls at entrances to warehouses and other buildings where trucks are driven in.



No. 290—Cast iron Vent Gratings.

This illustration shows two styles of cast iron Vent Gratings, used in walls. These gratings can be made any size and of any thickness of metal. Frames with anchors furnished if required. Prices on application. When ordering give outside measurements.



No. 292—Steel Guards with anchors, cast iron step, facing and landing or threshold.

No. 292 illustrates an entrance fitted with steel guards and cast iron step, curb, and threshold or floor plate. Any size or style, whether of steel or cast iron, can be furnished. Prices on application.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

EXPANDED METAL FOR REINFORCED CONCRETE



No. 293

Applications of expanded metal are very numerous and include Floor Construction, Solid and Hollow Partitions, Roofs, Column Protection, Reservoirs, Filtration Plants, Water Storage Tanks, Acid Tanks, Coal and Ash Hoppers, Bridge Floors, Culverts, Sewer and Water Pipes, Conduits, Walls of Buildings, etc.

The peculiar form of expanded metal in sheets of diagonal strands permits of the cutting of holes for circular stairs, flues, pipes, etc., etc., in the slabs without materially weakening the same, because the solid network will carry the stresses around the opening.

A few of the sizes manufactured are given below.

SIZES AND WEIGHTS

Gauge	Size of Mesh-Ins.	Size of Strand-Ins.	Weight per sq. ft. Pounds	Area in Sq. Ins. per ft. of width	Size of Sheet Feet
10	3	.140	0.6	0.177	8 ft.x6 ft. 6 ins.
14	$\frac{3}{4}$	$\frac{3}{32}$	0.937	0.281	8 ft.x6 ft. 8 ft.x4 ft.
18	$\frac{1}{2}$	$\frac{1}{16}$	0.500	0.150	"

By specifying the weight per square foot or width of strand as well as gauge of plate, Engineers and Architects are assured of getting the sectional area of steel required.

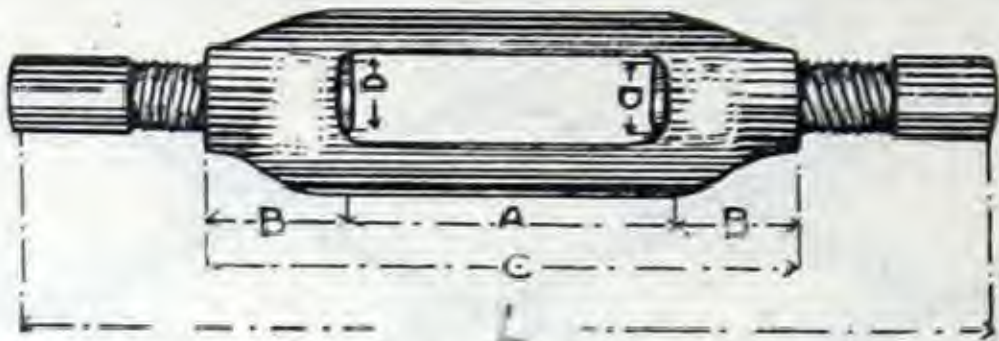
Expanded metal will be made up specially with any sectional area of steel required. The price depends entirely upon the weight and quantity required.

Write for prices giving full particulars as to gauge and size of mesh or state what it is wanted for and we will determine the proper size to use.

A large stock of this material is carried and prompt shipments can be made.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — Continued
TURNBUCKLES OR TRUSS ROD BUCKLES



No. 294

D—Size—Diameter of Screw. A—Length in Clear between Heads. B—Length of Tapped Heads—1½ D. C—Total Length of Buckle. L—Total Length of Buckle and Stub Ends, when open.

Size D.	A	B	C	L	Size D.	A	B	C	L
3/8	6	9/16	7 1/8	22	1 1/4	6	2 5/8	11 1/4	28
7/16	6	1 1/8	7 5/16	22	1 1/2	6	2 13/16	11 5/8	29
1/2	6	1 1/4	7 1/2	22	2	6	3	12	29
9/16	6	1 1/2	7 11/16	22	2 1/8	6	3 3/16	12 3/8	29
5/8	6	1 5/8	7 7/8	22	2 1/4	6	3 3/8	12 3/4	30
3/4	6	1 3/4	8 1/4	23	2 3/8	6	3 9/16	13 1/8	31
7/8	6	1 7/8	8 5/8	24	2 1/2	6	3 1/2	13 1/2	32
1	6	2	9	25	2 5/8	6	3 11/16	13 7/8	32
1 1/8	6	2 1/8	9 3/8	25	2 3/4	6	4 1/8	14 1/4	33
1 1/4	6	2 1/4	9 3/4	26	2 7/8	6	4 5/16	14 5/8	33
1 3/8	6	2 1/2	10 1/8	27	3	6	4 1/2	15	34
1 1/2	6	2 3/4	10 1/2	27	3 1/4	6	4 7/8	15 1/4	36
1 5/8	6	2 7/8	10 7/8	28	3 1/2	6	5 1/4	16 1/2	37

Lengths given above are Standard for Bridge, Roof and ordinary Truss Buckles.

They have a guaranteed strength of 60,000 pounds per square inch of section of bolt at bottom of thread. Stub bolts ends are made of good bridge iron having tensile strength of 50,000 pounds per square inch.

Open Buckles of this form can be adjusted with a bar, hook, or wrench, and have the great advantage of showing the ends of the bolts, so that inspectors can see that they have a good hold of thread, and do not butt together.

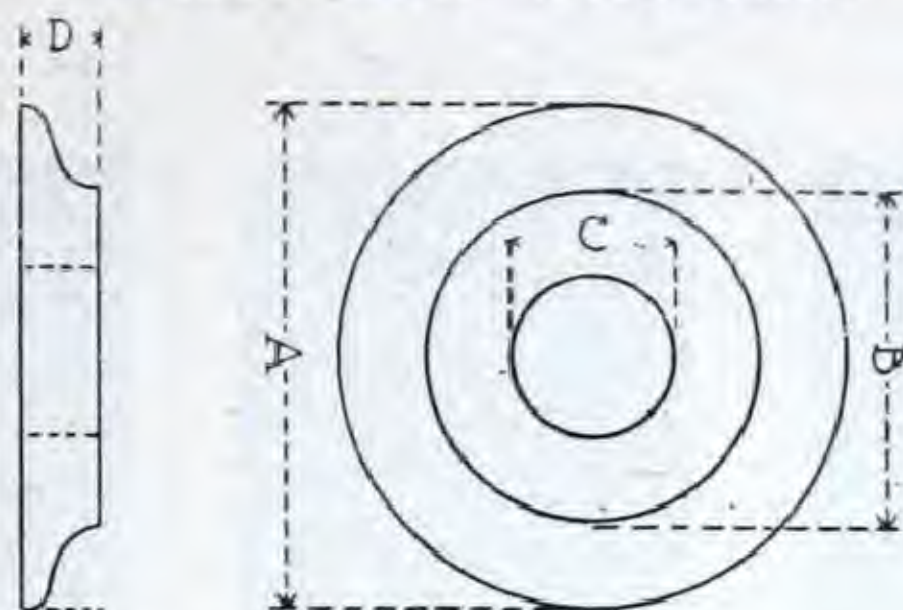
DIAMETER INCHES	WEIGHT EACH IN POUNDS	PRICE EACH
3/8	7/8	\$.40
1/2	1 1/2	.45
5/8	2 1/2	.50
3/4	3 1/2	.65
7/8	5	.75
1	7 1/2	.90
1 1/8	10	1.00
1 1/4	11 1/2	1.25
1 1/2	17	1.50
1 3/4	25	2.00
2	30	2.65

Write for discounts.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — Continued

CAST IRON WASHERS



No. 295—Standard cast "Ogee" Washers.

DIMENSIONS AND WEIGHTS

The letters A, B, C, D, refer to illustration above.

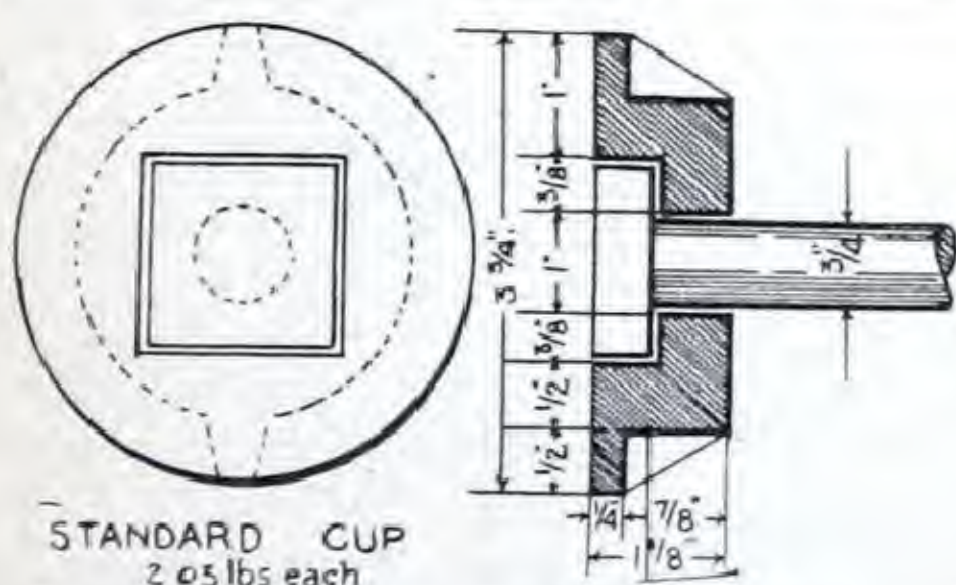
Diameter of Bolt = d-inch	A	B	C	D	Weight in Pounds
$\frac{1}{2}$	$2\frac{5}{8}$	$1\frac{3}{4}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{1}{2}$
$\frac{5}{8}$	3	$1\frac{7}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{3}{4}$
$\frac{3}{4}$	$3\frac{1}{4}$	$2\frac{1}{8}$	$\frac{13}{16}$	$\frac{7}{8}$	$1\frac{1}{4}$
$\frac{7}{8}$	$3\frac{3}{4}$	$2\frac{1}{2}$	$\frac{15}{16}$	$\frac{1}{2}$	$1\frac{1}{2}$
1	4	$2\frac{3}{4}$	$1\frac{1}{16}$	$1\frac{1}{8}$	$2\frac{1}{2}$
$1\frac{1}{8}$	$4\frac{3}{4}$	$2\frac{3}{4}$	$1\frac{3}{16}$	$1\frac{1}{8}$	3
$1\frac{1}{4}$	6	3	$1\frac{5}{16}$	$1\frac{3}{8}$	$5\frac{1}{4}$
$1\frac{1}{2}$	$6\frac{1}{4}$	$3\frac{1}{4}$	$1\frac{5}{8}$	$1\frac{1}{2}$	6
$1\frac{3}{4}$	$7\frac{1}{4}$	$3\frac{3}{4}$	$1\frac{7}{8}$	$1\frac{3}{4}$	$9\frac{1}{2}$
2	$8\frac{1}{4}$	$4\frac{1}{4}$	$2\frac{1}{8}$	2	$17\frac{1}{4}$
$2\frac{1}{4}$	$9\frac{1}{4}$	$4\frac{3}{4}$	$2\frac{3}{8}$	$2\frac{1}{4}$	20
$2\frac{1}{2}$	$10\frac{1}{4}$	$5\frac{1}{4}$	$2\frac{5}{8}$	$2\frac{1}{2}$	$27\frac{1}{4}$
$2\frac{3}{4}$	$11\frac{1}{4}$	$5\frac{3}{4}$	$2\frac{7}{8}$	$2\frac{3}{4}$	36
3	$12\frac{1}{4}$	$6\frac{1}{4}$	$3\frac{1}{8}$	3	46

For sizes not given above:

Diameter of bolt = d

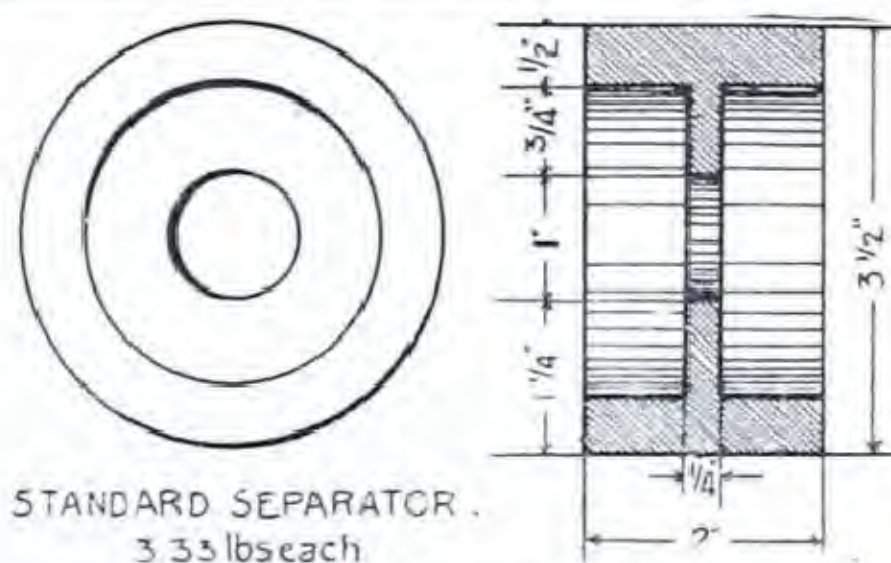
 $A = 4d + \frac{1}{4}$ -inch; $B = 2d + \frac{1}{4}$ inch; $C = d + \frac{1}{8}$ inch; $D = d$.

Price of all sizes. \$3 00 per 100 lbs.

STANDARD CUP
205 lbs each

No. 296—Cast iron Cup Washer.

Cup washers, as shown by No. 296, are used in timber bridge construction. We make all sizes and patterns. Prices on application.

STANDARD SEPARATOR.
333 lbs each

No. 297—Cast iron Separators.

Cast iron separators shown by No. 297, are used in timber bridge construction and in trestles for railroads. All sizes and patterns. Prices on application.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

STEEL FLOOR PLATES

No. 298



Ribbed

No. 299



Diamond

No. 300



Checkered

These plates are for use in boiler and engine rooms, breweries, for stairways, fire escapes, gutter plates, car platforms, sidewalks, deck plates on ships and every place where a cast iron plate is now used. They are made of the best open hearth steel, much stronger than cast iron floor plates, cheaper and 50 per cent. lighter. The following sizes of Diamond pattern plates are carried in stock. We can also furnish from mill the Ribbed, Checkered or Diamond in any size.

SIZES IN STOCK

Diamond Pattern

SIZE	SIZE	SIZE	SIZE
$\frac{3}{16}$ x24x 96	$\frac{3}{16}$ x36x 96	$\frac{1}{4}$ x36x 72	$\frac{5}{16}$ x36x120
$\frac{3}{16}$ x30x 96	$\frac{3}{16}$ x36x120	$\frac{1}{4}$ x36x 96	$\frac{3}{8}$ x30x 96
$\frac{3}{16}$ x30x120	$\frac{1}{4}$ x24x 96	$\frac{1}{4}$ x36x120	$\frac{3}{8}$ x36x 96
$\frac{3}{16}$ x36x 72	$\frac{1}{4}$ x30x 96	$\frac{5}{16}$ x36x 96	$\frac{3}{8}$ x36x120

APPROXIMATE WEIGHT PER SQUARE FOOT

Diamond Pattern

Thickness	Weight	Thickness	Weight
$\frac{1}{8}$	8 lbs.	$\frac{7}{16}$	19 lbs.
$\frac{3}{16}$	8 $\frac{3}{4}$ "	$\frac{1}{2}$	21 $\frac{1}{2}$ "
$\frac{1}{4}$	11 $\frac{1}{4}$ "	$\frac{5}{8}$	26 $\frac{1}{2}$ "
$\frac{5}{16}$	13 $\frac{3}{4}$ "	$\frac{3}{4}$	32 "
$\frac{3}{8}$	16 $\frac{1}{4}$ "	$\frac{7}{8}$	37 "

Thickness is given for body only and not over-all measurement.

EUREKA JOINT CEMENT

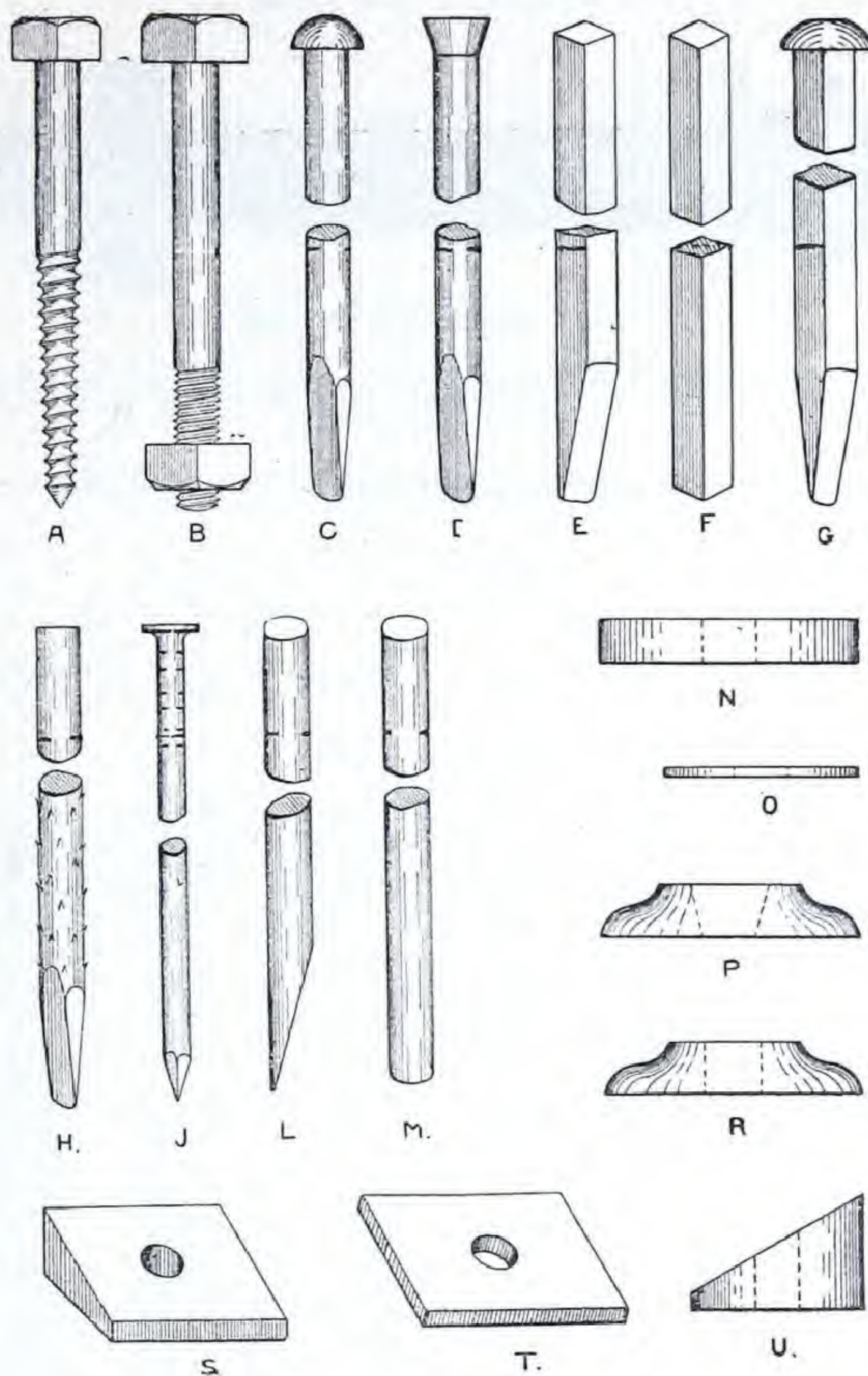
This cement is a universal standard for making tight joints on boilers, tanks, gas holders, vats, copper and iron steam kettles, etc. Alkali, mineral or gaseous waters, oils, ammonia or acids do not affect Eureka Cement and it can be used in place of red or white lead at one-third the cost. Carried in stock in 5, 10, 25, 50 and 100 lb. packages.

Write for information as to the application of this cement to your work.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — Continued

BRIDGE BOLTS



No. 301

A—Lag Screw. B—Bridge Bolt, square head and nut.
 C—Button head, wedge point, drift spike. D—Flat head, wedge point, drift spike. E—Square, shear point, drift spike without head.
 F—Square dowel pin. G—Pressed or ship spike. H—Ragged drift spike, wedge point, without head. J—Wine spike. L—Round, shear point drift spike, without head. M—Round dowel pin. N—Cast iron, flat separator or washer. O—Ordinary pressed, steel plate washer.
 P—Cast iron bridge washer with taper hole for flat or counter sunk head spike. R—Regular pattern, cast iron bridge washer. S—Square, cast iron, angle or bevel washer. T—Square, steel plate washer.
 U—Round, cast iron, angle or bevel washer.

NOTE.—In ordering from above list care must be taken to specify length, diameter, style of head and point, thickness of washer, size of hole, degree of angle, and whether washer is round or square.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

CARRIAGE BOLTS



No. 302—Carriage Bolt—Square Nut.

Approximate weight per 100 with square heads and nuts; length of bolt under head.

Diameter	$\frac{3}{16}$ in.	$\frac{1}{4}$ in.	$\frac{5}{16}$ in.	$\frac{3}{8}$ in.	$\frac{7}{16}$ in.	$\frac{1}{2}$ in.	$\frac{5}{8}$ in.
Length	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1 in.	1.72	2.94	4.75	7.50	10.44	15.	.....
1 $\frac{1}{4}$ in.	2.09	3.18	5.12	8.	11.94	16.	.....
1 $\frac{1}{2}$ in.	2.28	3.53	5.50	8.94	12.25	16.25	30.50
2 in.	2.53	4.21	6.75	10.12	13.81	19.13	35.25
2 $\frac{1}{2}$ in.	2.94	4.90	7.43	11.62	15.94	21.87	38.50
3 in.	3.34	5.59	8.43	12.81	17.75	24.25	44.06
3 $\frac{1}{2}$ in.	3.65	6.31	9.56	14.	20.	26.75	48.
4 in.	4.09	7.06	10.50	15.62	22.12	29.50	51.25
4 $\frac{1}{2}$ in.	.....	7.65	11.50	16.92	24.31	32.	55.37
5 in.	.....	8.25	12.37	18.18	25.94	34.12	60.50
5 $\frac{1}{2}$ in.	.....	8.76	14.	19.62	27.81	36.50	63.75
6 in.	.....	9.56	14.50	21.25	29.68	39.31	67.75
6 $\frac{1}{2}$ in.	.....	10.25	15.50	22.75	31.87	41.50	72.12
7 in.	.....	11.15	17.	24.06	34.31	43.81	76.
7 $\frac{1}{2}$ in.	.....	11.75	18.	25.75	35.87	47.81	80.
8 in.	.....	12.37	18.75	26.87	37.68	49.06	82.50
9 in.	.....	.....	21.	30.	42.25	55.	92.50
10 in.	.....	.....	21.18	33.	46.25	58.75	102.50
11 in.	.....	.....	.....	35.	49.44	65.93	108.75
12 in.	.....	.....	.....	38.	53.50	71.25	119.37
13 in.	.....	.....	.....	.....	.....	74.37	125.
14 in.	.....	.....	.....	.....	.....	82.09	133.63
15 in.	.....	.....	.....	.....	.....	85.59	139.63
16 in.	.....	.....	.....	.....	.....	92.56	151.25
17 in.	.....	.....	.....	.....	.....	97.50	158.56
18 in.	.....	.....	.....	.....	.....	103.09	164.37
19 in.	.....	.....	.....	.....	.....	108.18	171.18
20 in.	.....	.....	.....	.....	.....	114.12	179.56

Sleigh Shoe and Tire Bolts will average close to Carriage.

We have recently installed several new bolt making machines and we can now manufacture all kinds of bolts in large numbers at very reasonable prices.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous—Continued

MACHINE BOLTS



No. 303—Machine Bolts, square heads and nuts.

Approximate Weight per 100 with Square Heads and Nuts, Length of Bolt Under Head

Diameter	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Length	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1	3.25	6.13	8.75	12.88	18.75	.....	.....	.....	.....	.....
1 $\frac{1}{4}$	3.56	6.56	9.53	13.91	20.06	.....	.....	.....	.....	.....
1 $\frac{1}{2}$	3.88	7.00	10.31	14.94	21.37	29.50	38.50	.....	.....	.....
1 $\frac{3}{4}$	4.19	7.50	11.09	15.97	22.68	30.50	40.57	.....	.....	.....
2	4.56	8.00	11.88	17.00	24.00	31.50	42.65	65.50	108.00	.....
2 $\frac{1}{4}$	4.88	8.50	12.16	18.06	25.31	33.29	44.55	68.81	112.25	.....
2 $\frac{1}{2}$	5.13	9.00	13.44	19.12	26.62	35.08	46.45	72.12	116.50	175.00
2 $\frac{3}{4}$	5.44	9.50	14.22	20.18	27.93	36.87	48.35	75.43	121.75	180.00
3	5.75	10.00	15.00	21.25	29.25	38.67	50.25	78.75	126.00	185.00
3 $\frac{1}{4}$	6.06	10.50	15.67	22.31	30.56	40.46	52.84	82.06	130.13	190.50
3 $\frac{1}{2}$	6.38	11.00	16.34	23.37	31.87	42.25	55.43	85.37	134.25	196.00
3 $\frac{3}{4}$	6.70	11.50	17.01	24.43	33.18	44.04	58.03	88.68	138.38	201.50
4	7.02	12.00	17.67	25.50	34.50	45.84	60.63	91.99	142.50	207.00
4 $\frac{1}{2}$	7.66	13.00	19.00	27.63	37.13	49.42	64.88	97.99	151.00	218.00
5	8.30	14.00	20.33	29.75	39.75	53.00	69.13	103.99	159.55	229.00
5 $\frac{1}{2}$	8.94	15.00	21.66	31.88	42.38	56.58	73.38	109.99	168.00	240.00
6	9.58	16.00	23.00	34.00	45.00	60.17	77.63	116.00	176.60	251.00
6 $\frac{1}{2}$	10.22	17.00	24.58	36.13	47.62	63.69	81.88	122.00	185.00	262.00
7	10.86	18.00	26.17	38.25	50.24	67.21	86.13	128.00	193.65	273.00
7 $\frac{1}{2}$	11.50	19.00	27.75	40.38	52.86	70.73	90.38	134.00	202.00	284.00
8	12.14	20.00	29.33	42.50	55.48	74.24	94.61	140.00	210.70	295.00
9	12.78	22.00	32.50	46.75	60.72	81.26	103.10	152.05	227.75	317.00
10	14.06	24.00	35.66	51.00	66.00	88.28	111.59	164.10	244.80	339.00
11	.....	26.00	38.83	55.25	71.75	95.30	120.08	176.15	261.85	360.00
12	.....	28.00	42.00	59.50	77.50	102.32	128.57	188.20	278.90	382.00
13	.....	.....	.....	.....	83.25	109.34	137.06	200.25	295.95	404.00
14	.....	.....	.....	.....	88.72	116.36	145.55	212.28	313.00	426.00
15	.....	.....	.....	.....	94.18	123.38	154.04	224.31	330.05	448.00
16	.....	.....	.....	.....	99.65	130.40	162.53	236.34	347.10	470.00
17	.....	.....	.....	.....	105.11	137.43	171.02	248.38	364.15	492.00
18	.....	.....	.....	.....	110.58	144.45	179.51	260.41	381.20	514.00
19	.....	.....	.....	.....	116.05	151.47	188.00	272.45	398.25	536.00
20	.....	.....	.....	.....	121.50	158.50	196.50	284.50	415.30	558.00

Miscellaneous — *Continued*

COACH SCREWS, LAG SCREWS AND SKEIN SCREWS

WEIGHT OF ONE HUNDRED

Diameter	$\frac{1}{4}$ in.	$\frac{5}{16}$ in.	$\frac{3}{8}$ in.	$\frac{7}{16}$ in.	$\frac{1}{2}$ in.	$\frac{5}{8}$ in.	$\frac{3}{4}$ in.	$\frac{7}{8}$ in.	1 in.
Length	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1½ in.	2.37	3.72	5.20	8.83	11.15	.....	.....	.....	.....
1¾ in.	2.75	4.42	5.95	9.12	12.28	.....	.....	.....	.....
2 in.	3.	4.60	6.78	9.93	13.41	23.	.....	.....	.....
2¼ in.	3.30	5.04	7.20	10.95	14.94	26.	.....	.....	.....
2½ in.	3.68	5.47	7.68	11.68	16.47	27.25	39.50	.....	.....
3 in.	4.17	6.39	9.23	13.01	18.53	30.56	44.25	67.50	.....
3½ in.	4.70	7.12	10.26	15.15	20.47	34.12	50.25	70.31	.....
4 in.	5.40	8.04	11.56	16.25	22.69	38.62	56.62	80.43	106.25
4½ in.	5.95	8.79	12.86	18.18	25.87	41.62	62.25	87.81	112.50
5 in.	6.56	9.75	13.93	20.68	27.62	44.93	66.75	95.63	122.65
5½ in.	.....	10.53	14.89	21.37	30.	48.06	72.50	101.25	127.34
6 in.	.....	11.68	15.95	22.93	32.84	51.50	77.75	106.87	142.18
7 in.	.....	.....	.....	26.15	36.01	58.75	90.	125.31	160.15
8 in.	.....	.....	.....	.....	40.31	65.75	101.	140.31	176.56
9 in.	.....	.....	.....	.....	44.84	74.	112.	154.37	198.44
10 in.	.....	.....	.....	.....	49.92	80.75	120.	168.12	221.09
11 in.	.....	.....	.....	.....	53.98	87.25	130.94	177.81	237.50
12 in.	.....	.....	.....	.....	59.06	95.	142.	195.63	255.47

THE SIZE OF BOLT HEADS AND NUTS

Diameter of bolt equals 1.

Diameter of head and nut, square or hexagon equals 1½ from side to side.

Diameter of head and nut, hexagon equals 2 over the angles.

Thickness of head equals $\frac{3}{4}$ of diameter of bolt.

Thickness of nut equals diameter of bolt.

Approximately—The weight of a square head and square nut, together, will equal a rod of iron in length, six times the diameter of the bolt.

For hexagon head and square nut, five times the diameter.

For rose heads and square nuts, four times the diameter.

For upset bolts, allow for upsetting three and a half diameters.

For square heads and nuts, nine and a half diameters of bolt before upset.

For hexagon heads and nuts, seven and nine-tenths diameters.

For upsetting, square head and nut and two round washers, thirty-five diameters.

When much strained against wood, the side of a square wrought iron washer, or the diameter of a circular one, should not be less than four diameters of the screw; and in thickness $\frac{1}{2}$ diameter at least. When the bolt is not to be much strained, or when the timber is hard, the washer may be three diameters of screw in width, or diameter and thickness about .4 diameters.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

CUT STEEL NAILS AND SPIKES

Sizes, Lengths, and Approximate Number per Pound

Sizes	Length Inches	Common	Clinch	Finish'g	Casing and Box	Fencing	Spiques
2d	1	740	400	1100	.....	.....	.....
3d	1 $\frac{1}{4}$	460	260	880	.....	.....	.....
4d	1 $\frac{1}{2}$	280	180	530	420	.....	.....
5d	1 $\frac{3}{4}$	210	125	350	300	100	.....
6d	2	160	100	300	210	80	.....
7d	2 $\frac{1}{4}$	120	80	210	180	60	.....
8d	2 $\frac{1}{2}$	88	68	168	130	52	.....
9d	2 $\frac{3}{4}$	73	52	130	107	38	.....
10d	3	60	48	104	88	26	.....
12d	3 $\frac{1}{4}$	46	40	96	70	20	.....
16d	3 $\frac{1}{2}$	33	34	86	52	18	17
20d	4	23	24	76	38	16	14
25d	4 $\frac{1}{4}$	20	.....	.....	.....	.....	.....
30d	4 $\frac{1}{2}$	16 $\frac{1}{2}$	.....	.....	30	.....	11
40d	5	12	.....	.....	26	.....	9
50d	5 $\frac{1}{2}$	10	.....	.....	20	.....	7 $\frac{1}{2}$
60d	6	8	.....	.....	16	.....	6
.....	6 $\frac{1}{2}$	.....	.....	.....	.....	.....	5 $\frac{1}{2}$
.....	7	.....	.....	.....	.....	.....	5

Sizes	Length Inches	Barrel	Light Barrel	Slating	Sizes	Length In.	Flat Grip Fine	Edge Grip Fine
.....	.....	750	.....	.....	.....	.....	1462	.....
.....	.....	600	.....	.....	.....	.....	1300	.....
.....	.....	500	.....	.....	2d	1	1100	960
2d	1	450	.....	340	3d	1 $\frac{1}{8}$	800	750
.....	1 $\frac{1}{8}$	310	400	.....	4d	1 $\frac{3}{8}$	650	600
3d	1 $\frac{1}{4}$	280	304	280	Tobacco		Brads	Shingle
.....	1 $\frac{3}{8}$	210	.....	.....	.....		.....	.....
4d	1 $\frac{1}{2}$	190	224	220	130		.....	.....
5d	1 $\frac{3}{4}$	.....	.....	180	97		120	.....
6d	2	.....	.....	.....	85		94	.....
7d	2 $\frac{1}{4}$	.....	.....	.....	68		74	90
8d	2 $\frac{1}{2}$	.....	.....	.....	58		62	72
9d	2 $\frac{3}{4}$	.....	.....	.....	48		50	60
10d	3	.....	.....	.....	.....		40	.....
12d	3 $\frac{1}{4}$	.....	.....	.....	.....		27	.....
16d	3 $\frac{1}{2}$	.....	.....	.....	.....		.....	.....

We do not manufacture nails or cut spikes, but as we always have a large amount of material coming in from Eastern Canadian and American points we are able to quote very close prices for large or small lots.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous Tables — *Continued*

STANDARD STEEL WIRE NAILS AND SPIKES

Sizes, Lengths, and Approximate Number per Pound

Sizes	Length Ins.	COMMON			Barbed Common	Clinch	Fence	Finishing	Barbed Finishing	Fine	Barrel	Casing	Smooth Box
		Diameter		No. per lb.									
		B. W. G.	Inch										
	$\frac{3}{8}$										940		
	$\frac{7}{8}$										804		
2d	1	15	.072	900	860	622		1558	1558	1440	620	1140	1000
3d Fine	$1\frac{1}{8}$									810	590		
3d Com.	$1\frac{1}{4}$	14	.083	615	594	412		884	884		542	675	660
	$1\frac{3}{8}$										365		
4d	$1\frac{1}{2}$	$12\frac{1}{2}$	.102	322	339	267		767	767	550	322	567	550
5d	$1\frac{3}{4}$	$12\frac{1}{2}$	.102	250	230	230	127	491	491			396	366
6d	2	$11\frac{1}{2}$	.115	200	205	156	114	359	359			260	250
7d	$2\frac{1}{4}$	$11\frac{1}{2}$	.115	154	135	110	88	317	317			239	236
8d	$2\frac{1}{2}$	$10\frac{1}{4}$	.124	106	96	98	74	214	214			160	157
9d	$2\frac{3}{4}$	$10\frac{1}{4}$	.124	85	92	86	58	195	195			148	145
10d	3	9	.148	74	63	66	42	134	134			108	107
12d	$3\frac{1}{4}$	9	.148	57	52	57	36	120	120			99	98
16d	$3\frac{1}{2}$	8	.165	46	38	46	28	91	91			69	65
20d	4	6	.203	29	30	35	22	61	61			50	45
30d	$4\frac{1}{2}$	5	.220	23	23							45	40
40d	5	4	.238	17	17							35	30
50d	$5\frac{1}{2}$	3	.259	$13\frac{1}{2}$	$13\frac{1}{2}$								
60d	6	2	.284	$10\frac{1}{2}$	$10\frac{1}{2}$								

Sizes	Length Ins.	Barbed Box	Flooring Brads	Barbed Oval Head Car Nails		Slatting	Barbed Roofing	Shingle	Tobacco	Lining	WIRE SPIKES		
				Light	H'vy						Diameter		No. per lb.
											B.W.G.	Inch	
	$\frac{3}{8}$						648			1930			
	$\frac{7}{8}$						413			1660			
2d	1	1000				385	384			1440			
3d Fine	$1\frac{1}{8}$						339						
3d Com.	$1\frac{1}{4}$	660				230	231	380					
	$1\frac{3}{8}$												
4d	$1\frac{1}{2}$	550		260	164	198	154	256	256				
5d	$1\frac{3}{4}$	366		134	103	125	135	226	226				
6d	2	250	151	119	91	112	90	200	145				
7d	$2\frac{1}{4}$	236	136	85	73			130	130				
8d	$2\frac{1}{2}$	157	98	75	65			120	100				
9d	$2\frac{3}{4}$	145	86	58	51			115	85				
10d	3	107	66	55	45			79	65		6	.203	37
12d	$3\frac{1}{4}$	98	51	43	38								
16d	$3\frac{1}{2}$	65	40	39	34						5	.220	29
20d	4	45	29	31	26						4	.238	23
30d	$4\frac{1}{2}$	40		27	23						3	.259	18
40d	5	30		21	17						2	.284	13
50d	$5\frac{1}{2}$			18	14						1	.300	10
60d	6			15	13						1	.300	9
	$6\frac{1}{2}$											$\frac{5}{16}$	$7\frac{1}{2}$
	7											$\frac{5}{16}$	$6\frac{1}{2}$
	8											$\frac{3}{8}$	41
	9											$\frac{3}{8}$	33
	10											$\frac{3}{8}$	31
	12											$\frac{3}{8}$	23

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous Tables — *Continued*

MISCELLANEOUS STEEL WIRE NAILS

Approximate Number per Pound

Birmingham Wire Gauge	Diameter in Inches	Length in Inches										
		$\frac{3}{16}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$
00	.380	.....	.....	.....	.....	.....	.....	.....	.....	.....	33	27
$\frac{3}{8}$	.375	.....	.....	.....	.....	.....	.....	.....	.....	.....	33	27
0	.340	.....	.....	.....	.....	.....	.....	.....	.....	.....	34	29
$\frac{5}{16}$	.313	.....	.....	.....	.....	.....	.....	.....	57	50	45	38
2	.284	.....	.....	.....	.....	.....	.....	.....	65	58	52	44
3	.259	.....	.....	.....	.....	.....	100	87	76	67	60	50
4	.238	.....	.....	.....	.....	.....	120	104	90	80	72	60
5	.220	.....	.....	.....	211	169	141	121	106	94	85	71
6	.203	.....	.....	.....	247	197	164	141	123	111	99	82
7	.180	.....	.....	.....	299	239	200	171	149	133	120	100
8	.165	.....	.....	.....	345	275	229	197	172	153	137	115
9	.148	.....	.....	.....	414	331	276	236	207	184	165	138
10	.134	.....	.....	663	496	397	333	283	248	220	198	165
11	.120	.....	.....	837	628	502	418	359	314	279	251	209
12	.109	.....	.....	1096	822	658	548	469	411	365	329	274
13	.095	.....	.....	1429	1072	857	714	613	536	476	429	357
14	.083	.....	2840	1893	1420	1136	947	811	710	631	568	473
15	.072	.....	3504	2336	1752	1402	1168	1001	876	778	701	584
16	.065	.....	4571	3048	2280	1828	1523	1305	1143	1015	913	761
17	.058	.....	6233	4156	3116	2495	2077	1781	1558	1385	1246	1038
18	.049	.....	8276	5517	4138	3310	2758	2364	2069	1839	1655	1379
19	.042	.....	10668	7112	5334	4267	3556	2933	2667	2370	2133	1778
20	.035	20000	15000	10000	7500	6000	5000	4400	3750	3333	3000	.....
21	.032	23702	17777	11850	8888	7111	5926	5079	4444	.....	.....	.....
22	.028	30476	22856	15237	11428	9143	7618	.....	.....	.....	.....	.....

Bir- ming- ham Gauge	Diam. in Inch	Length in Inches														
		1 $\frac{3}{4}$	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{3}{4}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6	7	8	9	10
00	.380	23	20	18	16	15	14	12	10	9	8	7	6	5	4 $\frac{1}{2}$	4
$\frac{3}{8}$	.375	23	20	18	16	15	14	12	10	9	8	7	6	5	4 $\frac{1}{2}$	4
0	.340	25	21	19	17	16	15	13	11	10	9	8	7	5 $\frac{1}{2}$	5	4 $\frac{1}{2}$
$\frac{5}{16}$	.313	32	28	25	23	21	19	16	14	13	11	10	8	7	6	5 $\frac{1}{2}$
2	.284	37	32	29	26	24	22	19	16	14	13	11	9	8	7	6 $\frac{1}{2}$
3	.259	43	38	34	30	28	25	22	19	17	15	13	11	10	8	7 $\frac{1}{2}$
4	.238	51	45	40	36	33	30	26	23	20	18	15	13	11	10	9
5	.220	60	53	47	42	39	35	30	26	24	21	18	15	.....	
6	.203	71	62	55	50	45	41	35	31	28	25	21	18	.....	
7	.180	85	75	67	60	54	50	43	37	33	30	25	.....		
8	.165	98	86	76	69	62	57	49	43	39	35	29	.....		
9	.148	118	103	92	82	75	69	59	52	46	41	.....			
10	.134	142	124	110	99	90	83	71	62	55	50	.....			
11	.120	179	157	139	125	114	105	90	79	70	.....	Wire		11	12	
12	.109	235	204	182	164	149	137	117	103	.....	Gauge					
13	.095	306	268	238	214	195	178	153	.....						
14	.083	406	350	315	284	258	236	.....				00	3 $\frac{3}{4}$	3 $\frac{1}{4}$		
15	.072	500	438	389	350	.....				$\frac{3}{8}$				3 $\frac{3}{4}$	3 $\frac{1}{4}$	
16	.065	653	571	508	.....				0				4	3 $\frac{1}{2}$		
17	.058	890	779	.....				$\frac{5}{16}$				5	4 $\frac{1}{2}$			
18	.049	1182	.....				2				6	5 $\frac{1}{2}$				

These approximate numbers are an average only, and the figures given may be varied either way, by changes in the dimensions of heads or points. Brads and no-head nails will run more to the pound than table shows, and large or thick-headed nails will run less.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

SQUARE BOAT SPIKES

Approximate Number in a Keg of 200 Pounds

Size Inch	Length of Spike—Inches											
	3	4	5	6	7	8	9	10	11	12	14	16
$\frac{1}{4}$	3000	2375	2050	1825	.....	.....	.....	.....	.....	.....	.....	.....
$\frac{5}{16}$	1660	1360	1230	1175	990	880	.....	.....	.....	.....	.....	.....
$\frac{3}{8}$	1326	1140	940	800	650	600	525	475	.....	.....	.....	.....
$\frac{7}{16}$	.....	.....	.....	600	590	510	400	360	320	230	.....	.....
$\frac{1}{2}$	.....	.....	.....	450	375	335	300	275	260	240	.....	.....
$\frac{5}{8}$	.....	.....	.....	.....	.....	260	240	220	205	190	175	160

RAILROAD SPIKES

Size Measured Under Head Inches	Average Number per Keg of 200 Pounds	Quantity of Spikes per Mile of Single Track. Ties 2 feet c. to c. 4 Spikes per tie		Rail Used Weight per Yard Pounds
		Pounds	Kegs	
$5\frac{1}{2} \times \frac{5}{8}$	300	7040	$35\frac{1}{2}$	75 to 100
$5\frac{1}{2} \times \frac{9}{16}$	375	5870	$29\frac{1}{3}$	45 to 75
$5 \times \frac{9}{16}$	400	5170	26	40 to 56
$5 \times \frac{1}{2}$	450	4660	$23\frac{1}{3}$	35 to 40
$4\frac{1}{2} \times \frac{1}{2}$	530	3960	20	30 to 35
$4 \times \frac{1}{2}$	600	3520	$17\frac{2}{3}$	25 to 35
$4\frac{1}{2} \times \frac{7}{16}$	680	3110	$15\frac{1}{2}$	20 to 30
$4 \times \frac{7}{16}$	720	2910	$14\frac{3}{4}$	20 to 30
$3\frac{1}{2} \times \frac{7}{16}$	900	2350	11	16 to 25
$4 \times \frac{3}{8}$	1000	2090	$10\frac{1}{2}$	16 to 25
$3\frac{1}{2} \times \frac{3}{8}$	1190	1780	9	16 to 20
$3 \times \frac{3}{8}$	1240	1710	$8\frac{1}{2}$	16 to 20
$2\frac{1}{2} \times \frac{3}{8}$	1342	1575	$7\frac{1}{8}$	8 to 16

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*WEIGHTS OF 100 ROUND-HEADED RIVETS OR ROUND-HEADED BOLTS WITHOUT NUTS—*Wrought Iron*

Basis—1 cubic foot Iron = 480 pounds

Length under Head to Point Inches	Diameter of Rivet in Inches						
	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$
1	4.7	9.3	16.0	25.2	37.2	52.6	71.3
$1\frac{1}{4}$	5.5	10.7	18.1	28.3	41.3	58.0	78.2
$1\frac{1}{2}$	6.2	12.1	20.2	31.3	45.5	63.5	85.1
$1\frac{3}{4}$	7.0	13.4	22.4	34.4	49.7	68.9	92.0
2	7.8	14.8	24.5	37.5	53.9	74.4	98.9
$2\frac{1}{4}$	8.5	16.2	26.6	40.5	58.0	79.8	105.8
$2\frac{1}{2}$	9.3	17.5	28.8	43.6	62.2	85.3	112.7
$2\frac{3}{4}$	10.1	18.9	30.9	46.7	66.4	90.7	119.6
3	10.8	20.3	33.0	49.8	70.6	96.2	126.5
$3\frac{1}{4}$	11.6	21.6	35.1	52.8	74.7	101.6	133.4
$3\frac{1}{2}$	12.4	23.0	37.3	55.9	78.9	107.1	140.3
$3\frac{3}{4}$	13.1	24.3	39.4	59.0	83.1	112.6	147.2
4	13.9	25.7	41.5	62.0	87.3	118.0	154.1
$4\frac{1}{4}$	14.7	27.1	43.7	65.1	91.4	123.5	161.0
$4\frac{1}{2}$	15.4	28.4	45.8	68.2	95.6	128.9	167.9
$4\frac{3}{4}$	16.2	29.8	47.9	71.2	99.8	134.4	174.8
5	17.0	31.2	50.1	74.3	104.0	139.8	181.7
$5\frac{1}{4}$	17.7	32.5	52.2	77.4	108.2	145.3	188.6
$5\frac{1}{2}$	18.5	33.9	54.3	80.4	112.3	150.7	195.6
$5\frac{3}{4}$	19.3	35.3	56.4	83.5	116.5	156.2	202.5
6	20.0	36.6	58.6	86.6	120.7	161.6	209.4
$6\frac{1}{4}$	20.8	38.0	60.7	89.6	124.8	167.1	216.3
$6\frac{1}{2}$	21.6	39.3	62.8	92.7	129.0	172.5	223.2
$6\frac{3}{4}$	22.3	40.7	65.0	95.8	133.2	178.0	230.1
7	23.1	42.1	67.1	98.8	137.4	183.5	237.0
$7\frac{1}{4}$	23.9	43.4	69.2	101.9	141.6	188.9	243.9
$7\frac{1}{2}$	24.6	44.8	71.4	105.0	145.7	194.4	250.8
$7\frac{3}{4}$	25.4	46.2	73.5	108.0	149.9	199.8	257.7
8	26.2	47.5	75.6	111.1	154.1	205.3	264.6
$8\frac{1}{2}$	27.7	50.2	79.9	117.2	162.4	216.2	278.4
9	29.2	53.0	84.1	123.4	170.8	227.1	292.2
$9\frac{1}{2}$	30.8	55.7	88.4	129.5	179.1	238.0	306.0
10	32.3	58.4	92.7	135.6	187.5	248.8	319.8
$10\frac{1}{2}$	33.8	61.2	96.9	141.8	195.8	259.8	333.6
11	35.4	63.9	101.2	147.9	204.2	270.7	347.4
$11\frac{1}{2}$	36.9	66.6	105.4	154.1	212.5	281.6	361.2
12	38.4	69.3	109.7	160.2	220.9	292.5	375.0
One inch in length of 100 Rivets	3.07	5.45	8.52	12.27	16.70	21.82	27.61
Weight of 100 Rivet Heads	1.78	4.82	9.95	16.12	24.29	34.77	47.67

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

PLATE WASHERS

CUT, ROUND

Canadian Manufacturers' List. Revised March 1st, 1902.

Outside Diameter	Size of Hole	Thickness Wire Gauge	Size of Bolt	Price per 100 lbs.	Average No. in 100 lbs.
$\frac{9}{16}$ in.	$\frac{1}{4}$ in.	No. 18	$\frac{3}{16}$ in.	\$18.00	39,400
$\frac{3}{4}$ in.	$\frac{5}{16}$ in.	" 16	$\frac{1}{4}$ in.	15.00	15,000
$\frac{7}{8}$ in.	$\frac{3}{8}$ in.	" 16	$\frac{5}{16}$ in.	13.00	11,250
1 in.	$\frac{7}{16}$ in.	" 14	$\frac{3}{8}$ in.	10.50	6,800
$1\frac{1}{4}$ in.	$\frac{1}{2}$ in.	" 13	$\frac{7}{16}$ in.	10.00	4,300
$1\frac{3}{8}$ in.	$\frac{9}{16}$ in.	" 12	$\frac{1}{2}$ in.	9.20	2,600
$1\frac{1}{2}$ in.	$\frac{5}{8}$ in.	" 12	$\frac{9}{16}$ in.	9.10	2,250
$1\frac{3}{4}$ in.	$\frac{11}{16}$ in.	" 10	$\frac{5}{8}$ in.	9.00	1,300
$1\frac{3}{4}$ in.	$\frac{3}{4}$ in.	" 10	$\frac{11}{16}$ in.	8.80	1,580
2 in.	$\frac{13}{16}$ in.	" 10	$\frac{3}{4}$ in.	8.80	1,010
2 in.	$\frac{7}{8}$ in.	" 10	$\frac{13}{16}$ in.	8.80	1,110
$2\frac{1}{4}$ in.	$\frac{15}{16}$ in.	" 9	$\frac{7}{8}$ in.	8.80	860
$2\frac{1}{2}$ in.	1 in.	" 9	1 in.	8.80	625
$2\frac{3}{4}$ in.	$1\frac{1}{8}$ in.	" 9	$1\frac{1}{16}$ in.	8.80	670
$2\frac{3}{4}$ in.	$1\frac{1}{4}$ in.	" 9	$1\frac{1}{8}$ in.	8.80	520
$2\frac{3}{4}$ in.	$1\frac{5}{16}$ in.	" 9	$1\frac{1}{8}$ in.	8.80	570
3 in.	$1\frac{3}{8}$ in.	" 9	$1\frac{1}{4}$ in.	9.00	400
$3\frac{1}{4}$ in.	$1\frac{1}{2}$ in.	" 8	$1\frac{3}{8}$ in.	9.00	300
$3\frac{1}{2}$ in.	$1\frac{5}{8}$ in.	" 8	$1\frac{1}{2}$ in.	9.20	280
$3\frac{3}{4}$ in.	$1\frac{3}{4}$ in.	" 8	$1\frac{5}{8}$ in.	9.20	240
4 in.	$1\frac{7}{8}$ in.	" 8	$1\frac{3}{4}$ in.	9.50	215
$4\frac{1}{4}$ in.	2 in.	" 8	$1\frac{7}{8}$ in.	9.50	190
$4\frac{1}{2}$ in.	$2\frac{1}{8}$ in.	" 8	2 in.	9.50	175

Standard Package, 50 lb. boxes, price 6 cents per pound.

Net Extras—In lots under 50 lbs., 1 cent per lb. net extra.

In 25 lb. boxes, 2 cents per lb. net extra.

Special diameters 20% advance over nearest standard size.

Special gauges 20% advance for each gauge thinner or thicker than standard.

Write for discounts.

PLATE WASHERS

Heavy plate washers are furnished in large numbers for all classes of structural work. As we always carry a large stock of plates of all sizes and thicknesses, these washers can be turned out very promptly. When ordering always state width, length and thickness of plate, also size of bolt hole. Prices of plate washers average about 3 cents per pound

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*MEDIUM STEEL BARS FOR CONCRETE
REINFORCEMENT

No. 304—Round Rod, steel or iron.



No. 305—Square Bar, steel or iron.

PRICES AND WEIGHTS

Size—Inches	Weight per ft. round—lbs.	Price per 100 lbs—stock lengths	Weight per foot square pounds	Price per 100 lbs—stock lengths
$\frac{1}{4}$	.166	3.20	.212	3.60
$\frac{5}{16}$	.260	3.15	.333	3.55
$\frac{3}{8}$	.375	3.10	.478	3.50
$\frac{7}{16}$	.511	3.05	.650	3.45
$\frac{1}{2}$	.667	2.825	.850	3.225
$\frac{9}{16}$	.844	2.825	1.076	3.225
$\frac{5}{8}$	1.043	2.725	1.328	3.125
$\frac{11}{16}$	1.262	2.725	1.608	3.125
$\frac{3}{4}$	1.502	2.60	1.913	3.00
$\frac{7}{8}$	2.044	2.60	2.603	3.00
1	2.670	2.60	3.400	3.00
$1\frac{1}{8}$	3.379	2.60	4.303	3.00
$1\frac{1}{4}$	4.173	2.60	5.312	3.00

Write for discounts.

WEIGHT OF SQUARE TWISTED BARS

Same as Plain Square Bars. Cold twisted square bars are made of medium steel, manufacturer's standard specifications, see pages 203, 204 and 205. Prices on application.

All sizes of Bars carried in stock, lengths up to 32 feet.

An extra charge of 30 cents per 100 pounds will be made for cutting stock bars to schedule lengths.

Square twisted bars for concrete reinforcement were the first bars having a mechanical bond to be used. They are acknowledged to be the best and simplest form of reinforcement on the market to-day, and are generally used for such work all over the world in spite of the fact that there are hundreds of alleged patented "systems" of reinforcement advertised.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — *Continued*

BOILER TUBES

TABLE OF STANDARD DIMENSIONS

Diameter		Nominal thickness Inches	Nearest B Wire Gauge—No.	Circumference		Transverse Areas			Length of tube per sq. foot of		Nominal Weight per foot Pounds
External Inches	Internal Inches			External Inches	Internal Inches	External Sq. Inches	Internal Sq. Inches	Metal Sq. Inches	External surface, feet	Internal sur- face, feet	
1	.810	.095	13	3.142	2.545	.785	.515	.270	3.819	4.715	.90
1 $\frac{1}{4}$	1.060	.095	13	3.927	3.330	1.227	.882	.344	3.056	3.603	1.15
1 $\frac{1}{2}$	1.310	.095	13	4.712	4.115	1.767	1.347	.419	2.547	2.916	1.40
1 $\frac{3}{4}$	1.560	.095	13	5.498	4.901	2.405	1.911	.494	2.183	2.448	1.66
2	1.810	.095	13	6.283	5.686	3.142	2.573	.569	1.909	2.110	1.91
2 $\frac{1}{4}$	2.060	.095	13	7.069	6.472	3.976	3.333	.643	1.698	1.854	2.16
2 $\frac{1}{2}$	2.282	.109	12	7.854	7.169	4.909	4.090	.819	1.528	1.674	2.75
2 $\frac{3}{4}$	2.532	.109	12	8.639	7.954	5.940	5.035	.905	1.389	1.509	3.04
3	2.782	.109	12	9.425	8.740	7.069	6.079	.990	1.273	1.373	3.33
3 $\frac{1}{4}$	3.010	.120	11	10.210	9.456	8.296	7.116	1.180	1.175	1.269	3.96
3 $\frac{1}{2}$	3.260	.120	11	10.966	10.242	9.621	8.347	1.274	1.091	1.172	4.28
3 $\frac{3}{4}$	3.510	.120	11	11.781	11.027	11.045	9.676	1.369	1.018	1.088	4.60
4	3.732	.134	10	12.566	11.724	12.566	10.939	1.627	.955	1.024	5.47
4 $\frac{1}{2}$	4.232	.134	10	14.137	13.295	15.904	14.066	1.838	.849	.902	6.17
5	4.704	.148	9	15.708	14.778	19.635	17.379	2.256	.764	.812	7.58
6	5.670	.165	8	18.850	17.813	28.274	25.249	3.025	.637	.673	10.16
7	6.670	.165	8	21.991	20.954	38.485	34.942	3.543	.546	.573	11.90
8	7.670	.165	8	25.133	24.096	50.266	46.204	4.062	.477	.498	13.65
9	8.640	.180	7	28.274	27.143	63.617	58.629	4.988	.424	.442	16.76
10	9.594	.203	6	31.416	30.140	78.540	72.292	6.248	.382	.398	21.00
11	10.560	.220	5	34.558	33.175	95.033	87.583	7.451	.347	.362	25.00
12	11.542	.229	4 $\frac{1}{2}$	37.699	36.260	113.098	104.629	8.469	.319	.330	28.50
13	12.524	.238	4	40.841	39.345	132.733	123.190	9.543	.294	.305	32.06
14	13.594	.248	3 $\frac{1}{2}$	43.982	42.424	153.938	143.224	10.714	.273	.283	36.00
16	15.460	.270	2 $\frac{1}{2}$	50.265	48.569	201.060	187.710	13.350	.239	.247	45.20

NOTE.—In estimating effective steam-heating or evaporating surface of tubes, the surface in contact with air or gases of combustion, according to manner of application, as whether internal or external, is to be thus taken. For heating liquids by steam, superheating steam, or transferring heat from one liquid or one gas to another, mean surface of tubes to be computed. Stock lengths, 12, 14, 16, 18 and 20 feet.

TO CALCULATE THE HORSE-POWER OF ANY BOILER

Estimate the total heating surface in square feet. This is equal to the surface area of all the tubes, plus two-thirds the surface of the shell and both tube sheets minus the area of the tube holes. Then allow one horse-power for every fifteen square feet of heating surface in horizontal tubular boilers and one horse-power for every 11 $\frac{1}{2}$ square feet of heating surface in water tube boilers. It is the general practice to base the horse-power of ordinary boilers on the above computations.

When ordering or asking for prices, read carefully "Instructions to Buyer" on page 216

Miscellaneous — *Continued*

STANDARD WROUGHT MERCHANT PIPE

FOR

STEAM, WATER, GAS AND OIL

List revised and adopted February 15th, 1900.

Nominal Inside Diameter	Price, per ft. Black and Galvanized	Thickness	Nominal Weight per foot	No. of Threads per in. of Screw
Ins.		Ins.	Lbs.	
$\frac{1}{8}$	.05 $\frac{1}{2}$	.068	.24	27
$\frac{1}{4}$	.05 $\frac{1}{2}$	.088	.42	18
$\frac{3}{8}$	.05 $\frac{1}{2}$	.091	.56	18
$\frac{1}{2}$	.08 $\frac{1}{2}$	.109	.84	14
$\frac{3}{4}$	.11 $\frac{1}{2}$	.113	1.12	14
1	.16 $\frac{1}{2}$	.134	1.67	11 $\frac{1}{2}$
1 $\frac{1}{4}$	.22 $\frac{1}{2}$	.140	2.24	11 $\frac{1}{2}$
1 $\frac{1}{2}$	.27	.145	2.68	11 $\frac{1}{2}$
2	.36	.154	3.61	11 $\frac{1}{2}$
2 $\frac{1}{2}$	.57 $\frac{1}{2}$	.204	5.74	8
3	.75 $\frac{1}{2}$	.217	7.54	8
3 $\frac{1}{2}$	.95	.226	9.00	8
4	1.08	.237	10.66	8
4 $\frac{1}{2}$	1.30	.246	12.34	8
5	1.45	.259	14.50	8
6	1.88	.280	18.76	8
7	2.35	.301	23.27	8
8	2.82	.322	28.18	8
9	3.40	.344	33.70	8
10	4.25	.366	40.06	8
11	4.75	.375	45.02	8
12	5.20	.375	49.00	8

Write for discounts.

For cutting to lengths other than stock lengths as below, an extra charge of 5 cents per cut will be made.

For threading ends of pipe an extra charge of 7 cents per inch of thread will be made.

Stock lengths of merchant pipe are 19, 21 and 22 feet.

Miscellaneous — *Continued*

"X" STRONG PIPE

Size	Price per foot	Actual Outside Diameter	Nominal Inside Diameter	Thickness	Nominal Weight per foot
Ins.		Ins.	Ins.	Ins.	Lbs.
$\frac{1}{8}$	.11	.405	.205	.100	.29
$\frac{1}{4}$	.11	.54	.294	.123	.54
$\frac{3}{8}$	.11	.675	.421	.127	.74
$\frac{1}{2}$	.12	.84	.542	.149	1.09
$\frac{3}{4}$	.15	1.05	.736	.157	1.39
1	.22	1.315	.951	.182	2.17
$1\frac{1}{4}$	.30	1.66	1.272	.194	3.00
$1\frac{1}{2}$	.36	1.90	1.494	.203	3.63
2	.50	2.375	1.933	.221	5.02
$2\frac{1}{2}$	.81	2.875	2.315	.280	7.67
3	1.05	3.50	2.892	.304	10.25
$3\frac{1}{2}$	1.33	4.00	3.358	.321	12.47
4	1.50	4.50	3.818	.341	14.97
$4\frac{1}{2}$	1.95	5.00	4.25	.35	17.60
5	2.16	5.563	4.813	.375	20.54
6	2.90	6.625	5.750	.437	28.58
7	3.80	7.625	6.62	.50	37.60
8	4.30	8.625	7.50	.56	47.85

The outside diameters of Extra Strong are the same as Standard Pipe.
The extra thickness decreases inside diameter.

Extra Strong Pipe is always shipped plain ends, unless otherwise specified.

Additional charge will be made for threads and sockets.

Write for discounts.

For cutting to lengths other than stock lengths as below an extra charge of 5 cents per cut will be made.

For threading ends of pipe an extra charge of 7 cents per inch of thread will be made.

Stock lengths of "X" pipe are 19, 21 and 22 feet.

Miscellaneous — *Continued*

"XX" STRONG PIPE

Size	Price per foot	Actual outside Diameter	Nominal inside Diameter	Thickness	Nominal w'ght per foot
Ins.		Ins.	Ins.	Ins.	Lbs.
$\frac{1}{2}$	.25	.84	.244	.298	1.70
$\frac{3}{4}$	.30	1.05	.422	.314	2.44
1	.37	1.315	.587	.364	3.65
$1\frac{1}{4}$	.52	1.66	.885	.388	5.20
$1\frac{1}{2}$	.65	1.90	1.088	.406	6.40
2	.95	2.375	1.491	.442	9.02
$2\frac{1}{2}$	1.37	2.875	1.755	.560	13.68
3	1.92	3.50	2.284	.608	18.56
$3\frac{1}{2}$	2.45	4.00	2.716	.642	22.75
4	2.85	4.50	3.136	.682	27.48
$4\frac{1}{2}$	3.30	5.00	3.56	.72	32.53
5	3.80	5.563	4.063	.75	38.12
6	5.30	6.625	4.875	.875	53.11
7	6.25	7.625	5.875	.875	62.38
8	7.20	8.625	6.875	.875	71.62

Write for discounts.

The outside diameters of Double Extra Strong Pipe are the same as Standard, the extra thickness decreasing the inside diameter.

This class of Pipe is always shipped plain ends, unless otherwise specified.

For cutting to lengths other than stock lengths as below, an extra charge of 7 cents per cut will be made.

For threading ends of pipe, an extra charge of 8 cents per inch of thread will be made.

Stock lengths of "XX" Pipe are 19, 21 and 22 feet.

HORSE POWER OF AN ENGINE

a = Area of piston in square inches.

p = Mean pressure of the steam on the piston per square inch.

v = Velocity of piston per minute in feet.

$$\text{Then H. P.} = \frac{a \times p \times v}{33000}$$

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Miscellaneous — Continued

STANDARD WROUGHT IRON COUPLINGS

SIZES, WEIGHTS AND PRICES

Size of Pipe Inches	Price Black Each	Price Galv. Each	Price Right and Left Black Each	Price Right Hand Faced Black Each	Price Right Hand Faced Galv. Each	Nom- inal Outside Diam- eter Inches	Length of Coup- ling Inches	Average Weight of Coup- ling Pounds	No. of Threads per Inch of Screw
$\frac{1}{8}$	.05	.06	.....	.....	.....	$\frac{19}{32}$	$\frac{15}{16}$	.03	27
$\frac{1}{4}$	.05	.06	.07	.09	.14	$\frac{3}{4}$	$1\frac{1}{32}$	.07	18
$\frac{3}{8}$	.06	.08	.08	.10	.15	$\frac{29}{32}$	$1\frac{5}{32}$	.11	18
$\frac{1}{2}$	.07	.10	.11	.12	.18	$1\frac{3}{32}$	$1\frac{5}{16}$	.15	14
$\frac{3}{4}$	.10	.13	.15	.16	.24	$1\frac{11}{32}$	$1\frac{9}{16}$	.25	14
1	.13	.18	.20	.22	.33	$1\frac{5}{8}$	$1\frac{13}{16}$	.42	$11\frac{1}{2}$
$1\frac{1}{4}$	.17	.25	.25	.30	.45	$1\frac{3}{2}$	$2\frac{1}{16}$	.60	$11\frac{1}{2}$
$1\frac{1}{2}$	.21	.32	.30	.40	.60	$2\frac{15}{16}$	$2\frac{5}{16}$	.81	$11\frac{1}{2}$
2	.28	.40	.50	.50	.75	$2\frac{23}{32}$	$2\frac{9}{16}$	1.18	$11\frac{1}{2}$
$2\frac{1}{2}$	.40	.55	.85	.70	1.00	$3\frac{5}{16}$	$2\frac{7}{8}$	1.70	8
3	.60	.80	1.20	.90	1.35	$3\frac{15}{16}$	$3\frac{1}{16}$	2.45	8
$3\frac{1}{2}$	.80	1.05	1.60	1.20	1.80	$4\frac{7}{16}$	$3\frac{7}{16}$	3.40	8
4	1.00	1.40	2.00	1.50	2.25	$4\frac{15}{16}$	$3\frac{7}{16}$	3.50	8
$4\frac{1}{2}$	1.50	2.00	.....	2.10	.....	$5\frac{17}{32}$	$3\frac{5}{8}$	4.70	8
5	1.65	2.25	.....	2.40	.....	$6\frac{1}{4}$	$4\frac{1}{8}$	8.50	8
6	2.40	3.25	.....	3.60	.....	$7\frac{9}{32}$	$4\frac{1}{8}$	9.70	8
7	3.25	.....	.....	.....	.....	$8\frac{9}{32}$	$4\frac{1}{8}$	11.10	8
8	4.25	.....	.....	.....	.....	$9\frac{1}{4}$	$4\frac{5}{8}$	13.60	8
9	5.50	.....	.....	.....	.....	$10\frac{5}{16}$	$5\frac{1}{8}$	17.40	8
10	7.50	.....	.....	.....	.....	$11\frac{5}{8}$	$6\frac{1}{8}$	31.10	8
12	10.00	.....	.....	.....	.....	$13\frac{7}{8}$	$6\frac{1}{8}$	44.20	8

$1\frac{1}{4}$ inch turned and faced Couplings to fit inside of 2 inch wrought pipe. Price on application.

WROUGHT IRON COUPLINGS

MISCELLANEOUS SIZES

Size Inches	$\frac{3}{8}$	$\frac{1}{2}$	1	1	1	$1\frac{1}{4}$	$1\frac{1}{4}$	2
Outside Diam. Inc.	$\frac{15}{16}$	$1\frac{1}{8}$	$1\frac{7}{8}$	$1\frac{21}{32}$	2	$1\frac{15}{16}$	$2\frac{9}{32}$	$2\frac{15}{16}$
Length Inches	$1\frac{3}{4}$	2	$2\frac{7}{8}$	$3\frac{1}{2}$	$3\frac{1}{8}$	3	$3\frac{1}{4}$	$3\frac{3}{4}$

These Couplings are made to order only. Prices according to quantity, on application.

Miscellaneous — *Continued*

WEIGHTS AND DIMENSIONS OF SQUARE NUTS

Manufacturers' Standard Sizes

BASIS—HOOPES & TOWNSEND'S LIST

Diameter of Bolt	Short Diameter	Long Diameter	Thickness	Diameter of Rough Hole	Plain		Cupped	
					Weight per 100	Number in 100	Weight per 100	Number in 100
Inches	Inches	Inches	Inches	Inches	Pounds	Pounds	Pounds	Pounds
$\frac{1}{4}$	$\frac{1}{2}$	.707	$\frac{1}{4}$	$\frac{7}{32}$	1.5	6750	1.4	7200
$\frac{5}{16}$	$\frac{5}{8}$	.884	$\frac{5}{16}$	$\frac{9}{32}$	2.8	3540	2.5	4000
$\frac{3}{8}$	$\frac{3}{4}$	1.061	$\frac{3}{8}$	$\frac{11}{32}$	4.8	2100	4.2	2380
$\frac{7}{16}$	$\frac{7}{8}$	1.237	$\frac{7}{16}$	$\frac{13}{32}$	7.5	1330	6.8	1460
$\frac{1}{2}$	1	1.237	$\frac{1}{2}$	$\frac{7}{16}$	8.9	1120	8.1	1230
$\frac{5}{8}$	$1\frac{1}{8}$	1.414	$\frac{5}{8}$	$\frac{7}{16}$	11.9	840	10.8	930
$\frac{3}{4}$	$1\frac{1}{4}$	1.591	$\frac{3}{4}$	$\frac{1}{2}$	15.4	650	14.3	700
$\frac{7}{8}$	$1\frac{3}{4}$	1.591	$\frac{7}{8}$	$\frac{9}{16}$	17.3	575	16.1	620
1	2	1.768	1	$\frac{5}{8}$	23.0	435	21.1	475
$1\frac{1}{8}$	$2\frac{1}{4}$	1.768	$1\frac{1}{8}$	$\frac{3}{4}$	27.8	360	25.0	400
$1\frac{1}{4}$	$2\frac{1}{2}$	1.945	$1\frac{1}{4}$	$\frac{7}{8}$	31.7	315	29.0	345
$1\frac{3}{8}$	3	2.122	$1\frac{3}{8}$	1	41.0	244	37.0	270
$1\frac{1}{2}$	$3\frac{1}{4}$	2.122	$1\frac{1}{2}$	$1\frac{1}{8}$	46.5	215	41.7	240
$1\frac{3}{4}$	$3\frac{1}{2}$	2.298	$1\frac{3}{4}$	$1\frac{1}{4}$	55.6	180	48.8	205
$1\frac{7}{8}$	$3\frac{3}{4}$	2.475	$1\frac{7}{8}$	$1\frac{3}{8}$	61.3	163	54.6	183
2	4	2.475	2	$1\frac{1}{2}$	70.9	141	64.1	156
$2\frac{1}{8}$	$4\frac{1}{4}$	2.828	$2\frac{1}{8}$	$1\frac{5}{8}$	95.2	105	87.0	115
$2\frac{1}{4}$	$4\frac{1}{2}$	2.828	$2\frac{1}{4}$	$1\frac{3}{4}$	102.0	98	94.3	106
$2\frac{3}{8}$	$4\frac{3}{4}$	3.182	$2\frac{3}{8}$	$1\frac{7}{8}$	135.1	74	123.5	81
$2\frac{1}{2}$	5	3.182	$2\frac{1}{2}$	2	156.3	64	142.9	70
$2\frac{7}{8}$	$5\frac{1}{4}$	3.536	$2\frac{7}{8}$	$2\frac{1}{8}$	192.3	52	175.4	57
3	$5\frac{1}{2}$	3.889	3	$2\frac{1}{4}$	250.0	40	227.3	44
$3\frac{1}{8}$	$5\frac{3}{4}$	4.243	$3\frac{1}{8}$	$2\frac{3}{8}$	317.5	31 $\frac{1}{2}$	285.7	35
$3\frac{1}{4}$	6	4.597	$3\frac{1}{4}$	$2\frac{1}{2}$	454.5	22	400.0	25
$3\frac{3}{8}$	$6\frac{1}{4}$	4.950	$3\frac{3}{8}$	$2\frac{5}{8}$	555.6	18	500.0	20
$3\frac{1}{2}$	$6\frac{1}{2}$	5.303	$3\frac{1}{2}$	$2\frac{3}{4}$	666.7	15	625.0	16
$3\frac{7}{8}$	$6\frac{3}{4}$	5.657	$3\frac{7}{8}$	$2\frac{7}{8}$	816.3	12 $\frac{1}{4}$	784.3	12 $\frac{3}{4}$

Miscellaneous — *Continued*

WEIGHTS AND DIMENSIONS OF HEXAGON NUTS

Manufacturers' Standard Sizes

Basis—HOOPES & TOWNSEND'S LIST

Diameter of Bolt	Short Diameter	Long Diameter	Thickness	Diameter of Rough Hole	Plain		Cupped	
					Weight per 100	Number	Weight per 100	Number
						in 100		in 100
Inches	Inches	Inches	Inches	Inches	Pounds	Pounds	Pounds	Pounds
$\frac{1}{4}$	$\frac{1}{2}$	.578	$\frac{1}{4}$	$\frac{7}{32}$	1.3	7800	1.2	8500
$\frac{5}{16}$	$\frac{5}{8}$	.722	$\frac{5}{16}$	$\frac{3}{8}$	2.3	4440	2.1	4790
$\frac{3}{8}$	$\frac{3}{4}$	.866	$\frac{3}{8}$	$\frac{11}{32}$	4.3	2330	4.0	2510
$\frac{7}{16}$	$\frac{7}{8}$	1.011	$\frac{7}{16}$	$\frac{13}{32}$	7.0	1430	6.3	1580
$\frac{1}{2}$	1	1.011	$\frac{1}{2}$	$\frac{3}{4}$	7.5	1330	6.9	1440
$\frac{1}{2}$	1	1.155	$\frac{1}{2}$	$\frac{7}{8}$	9.9	1010	9.2	1090
$\frac{1}{2}$	1	1.155	$\frac{1}{2}$	1	10.8	930	10.2	980
$\frac{9}{16}$	$1\frac{1}{8}$	1.299	$\frac{9}{16}$	$1\frac{1}{8}$	13.7	730	12.5	800
$\frac{5}{8}$	$1\frac{1}{8}$	1.299	$\frac{5}{8}$	$1\frac{1}{4}$	15.9	630	15.2	660
$\frac{3}{4}$	$1\frac{1}{8}$	1.299	$\frac{3}{4}$	$1\frac{1}{2}$	17.9	560	17.0	588
$\frac{3}{4}$	$1\frac{1}{4}$	1.444	$\frac{3}{4}$	$1\frac{3}{4}$	19.5	514	18.5	541
$\frac{3}{4}$	$1\frac{1}{4}$	1.444	$\frac{3}{4}$	2	23.0	435	21.7	460
$\frac{3}{4}$	$1\frac{3}{4}$	1.444	$\frac{3}{4}$	$2\frac{1}{4}$	22.2	450	20.6	485
$\frac{3}{4}$	2	1.588	$\frac{3}{4}$	$2\frac{1}{2}$	26.6	376	25.4	394
$\frac{3}{4}$	$2\frac{1}{4}$	1.588	$\frac{3}{4}$	$2\frac{3}{4}$	30.3	330	28.8	347
$\frac{3}{4}$	$2\frac{3}{4}$	1.733	$\frac{3}{4}$	3	34.5	290	32.3	310
$\frac{3}{4}$	3	1.733	$\frac{3}{4}$	$3\frac{1}{4}$	40.0	250	37.6	266
$\frac{3}{4}$	$3\frac{1}{4}$	1.733	$\frac{3}{4}$	$3\frac{1}{2}$	37.7	265	35.3	283
$\frac{3}{4}$	$3\frac{1}{2}$	1.733	1	$3\frac{3}{4}$	45.9	218	43.5	230
$\frac{3}{4}$	$3\frac{3}{4}$	1.877	1	4	45.3	221	42.6	235
$\frac{3}{4}$	4	1.877	1	$4\frac{1}{4}$	50.8	197	47.6	210
1	$3\frac{1}{4}$	2.021	1	$4\frac{1}{2}$	57.5	174	53.8	186
1	$3\frac{3}{4}$	2.021	$1\frac{1}{8}$	$4\frac{3}{4}$	63.7	157	59.5	168
$1\frac{1}{8}$	2	2.309	$1\frac{1}{4}$	5	100.0	100	90.9	110
$1\frac{1}{4}$	$2\frac{1}{4}$	2.599	$1\frac{3}{8}$	$5\frac{1}{4}$	138.9	72	126.6	79
$1\frac{3}{8}$	$2\frac{1}{2}$	2.888	$1\frac{1}{2}$	$5\frac{1}{2}$	185.2	54	169.5	59
$1\frac{1}{2}$	$2\frac{3}{4}$	3.176	$1\frac{5}{8}$	$5\frac{3}{4}$	243.9	41	222.2	45
$1\frac{5}{8}$	3	3.464	$1\frac{3}{4}$	6	333.3	30	303.0	33
$1\frac{3}{4}$	$3\frac{1}{4}$	3.754	$1\frac{7}{8}$	$6\frac{1}{4}$	408.2	24 $\frac{1}{2}$	370.4	27
$1\frac{7}{8}$	$3\frac{1}{2}$	4.043	2	$6\frac{1}{2}$	493.8	20 $\frac{1}{4}$	459.8	21 $\frac{3}{4}$
2	$3\frac{1}{2}$	4.043	2	$6\frac{3}{4}$	487.8	20 $\frac{1}{2}$	454.5	22
2	$3\frac{3}{4}$	4.043	$2\frac{1}{8}$	7	512.8	19 $\frac{1}{2}$	487.8	20 $\frac{1}{2}$

When ordering or asking for prices read carefully "Instructions to Buyers" on page 216

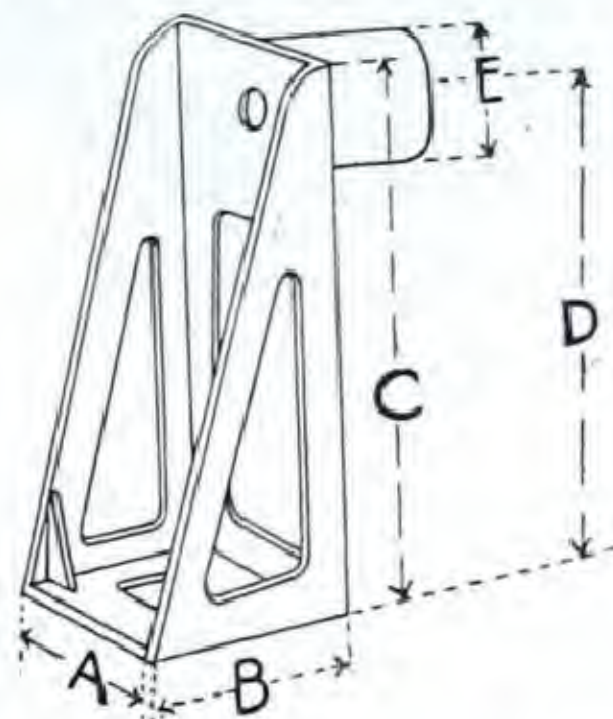
Joist and Wall Hangers

The old method of framing by mortise and tenon is obsolete. By the use of Joist Hangers the shrinkage of the joist is reduced to a minimum.

Mr. F. E. Kidder, the renowned authority and author of works on building construction, says:

"All headers six feet long or over should be carried in Joist hangers or stirrups, and in warehouses and all first-class buildings all framing should be done by means of joist hangers."

DUPLEX JOIST HANGERS (Patented)



No. 306—Duplex Joist Hangers.

SPECIAL NOTICE

Bore Holes for Nipple E 1-16 inch larger than sizes given below

Number of Hanger	A	B	C	D	E	Length of Lug
10	2 inch	3 inch	5 $\frac{3}{4}$ inch	5 inch	1 $\frac{1}{2}$ inch	1 $\frac{3}{4}$ inch
14	2 "	3 "	8 "	7 "	1 $\frac{3}{4}$ "	2 "
15	3 "	3 "	5 $\frac{3}{4}$ "	5 "	1 $\frac{5}{8}$ "	2 $\frac{1}{4}$ "
18	2 $\frac{1}{2}$ "	3 "	8 "	7 "	1 $\frac{3}{4}$ "	2 $\frac{1}{2}$ "
20	4 "	3 "	5 $\frac{3}{4}$ "	5 "	1 $\frac{1}{4}$ "	2 "
21	3 "	3 "	8 "	7 "	1 $\frac{7}{8}$ "	2 $\frac{1}{2}$ "
21X	3 "	3 "	10 "	9 "	1 $\frac{7}{8}$ "	2 $\frac{1}{2}$ "
28	4 "	3 $\frac{1}{2}$ "	8 $\frac{1}{4}$ "	7 "	1 $\frac{3}{8}$ "	2 $\frac{3}{4}$ "
28X	4 "	3 $\frac{1}{2}$ "	10 "	9 "	2 $\frac{3}{8}$ "	2 $\frac{7}{8}$ "
53	5 "	3 $\frac{1}{2}$ "	8 $\frac{1}{4}$ "	7 "	2 $\frac{3}{8}$ "	3 "
16	6 "	3 $\frac{1}{2}$ "	6 "	5 "	2 "	2 $\frac{3}{4}$ "
60	6 "	3 $\frac{1}{2}$ "	8 $\frac{1}{4}$ "	7 "	2 $\frac{3}{8}$ "	3 "
60X	6 "	4 "	9 $\frac{1}{2}$ "	8 "	2 $\frac{3}{8}$ "	3 "
80	8 "	4 "	8 $\frac{1}{4}$ "	7 "	2 $\frac{3}{8}$ "	3 $\frac{1}{4}$ "
90	8 "	4 "	9 $\frac{1}{2}$ "	8 "	2 $\frac{3}{8}$ "	3 "
35 R & L		3 $\frac{3}{4}$ "	8 $\frac{1}{4}$ "	7 "	2 $\frac{3}{8}$ "	3 $\frac{1}{4}$ "
75 R & L		4 $\frac{1}{4}$ "	11 $\frac{1}{2}$ "	10 "	2 $\frac{7}{8}$ "	3 $\frac{1}{2}$ "

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

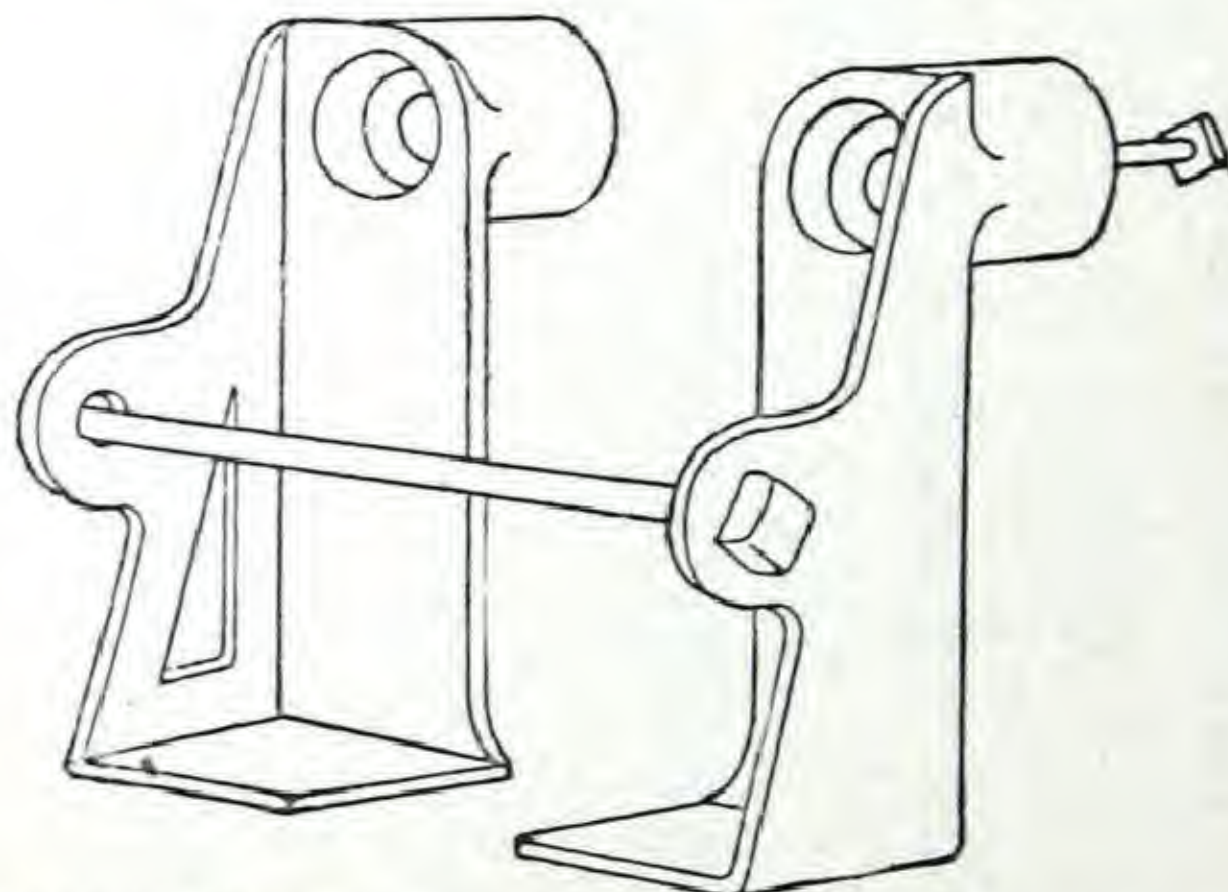
Joist and Wall Hangers — *Continued*



No. 307—Duplex Joist Hangers.

PRICE LIST

No. 10,	to carry Joist	....2 x 6 to 2 x 10	\$0.20....	Shipg.	Wgt.	2½ lbs.
No. 14,	"	....2 x 12 to 2 x 16	.30....	"	"	3½ "
No. 15,	"	....3 x 6 to 3 x 10	.30....	"	"	2½ "
No. 18,	"	....2½ x 6 to 2½ x 16	.40....	"	"	3½ "
No. 20,	"	....4 x 6 to 4 x 10	.35....	"	"	3 "
No. 21,	"	....3 x 12 to 3 x 14	.45....	"	"	3 "
No. 21X,	"	....3 x 16 to 3 x 20	.50....	"	"	4½ "
No. 28,	"	....4 x 12 to 4 x 14	.60....	"	"	4½ "
No. 28X,	"	....4 x 16 to 4 x 20	.70....	"	"	7½ "
No. 53,	"	....5 x 8 to 5 x 16	.75....	"	"	5½ "
No. 16,	"	....6 x 6 to 6 x 9	.50....	"	"	4 "
No. 60,	"	....6 x 10 to 6 x 12	.80....	"	"	6½ "
No. 60X,	"	....6 x 14 to 6 x 16	1.00....	"	"	8½ "
No. 80,	"	....8 x 8 to 8 x 12	1.00....	"	"	10½ "
No. 90,	"	....8 x 16 to 8 x 18	1.50....	"	"	14 "



No. 308—Duplex Joist Hangers, used in pairs. Each Hanger tested. The best Hanger for heavy mill construction work.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Joist and Wall Hangers — *Continued*

Mr. Kidder states in the Architect's & Builder's Pocket Book:—

CONNECTION OF FLOOR BEAMS AND GIRDERS

"To render the construction slow burning, and particularly the girders, it is important that there be no hollow space between the top of the girders and the flooring, or that the TOPS OF THE FLOOR BEAMS SHALL BE FLUSH WITH THE TOP OF THE GIRDER. This of course necessitates framing of the floor beams to the girders. For heavy construction the only kind of framing that is permissible is by means of some form of joist hanger. When the floor beams are 6-in. x 12-in. or larger, and the girders are of wood heavy hangers as shown by No. 308 should be used."

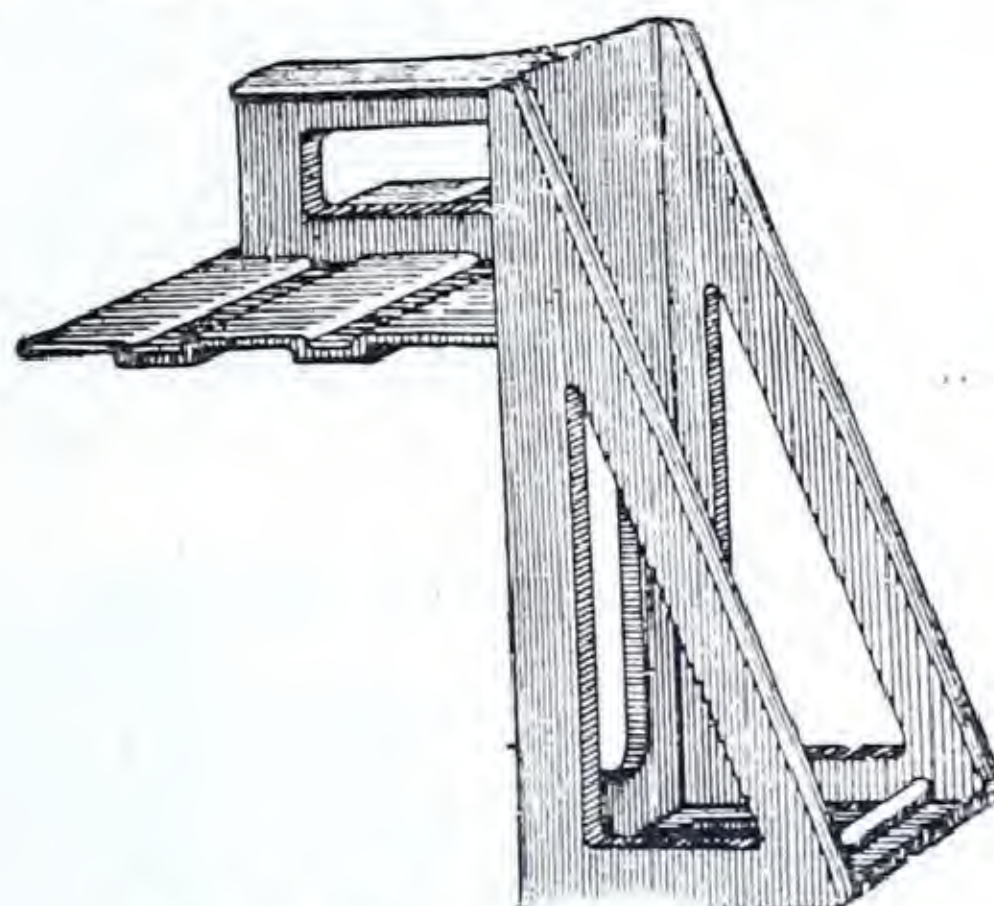
ESPECIALLY ADAPTED FOR MILL CONSTRUCTION

This pattern of JOIST HANGER is made in the following sizes:

				Shipping Weights
No. 35R	Used in pairs...	{ 8 x 8 to 8 x 14	\$1.25 a pair	9½ lbs. each pair without bolts
No. 35L		{ 10 x 10 to 10 x 14		
No. 75R	"	{ 10 x 16 to 16 x 18	\$2.00 a pair	19½ lbs. each pair without bolts
No. 75L	"			

45 degree angle hangers of all sizes carried in stock. Extra charge for bolts.

DUPLEX WALL HANGERS



No. 309—Duplex Wall Hangers.

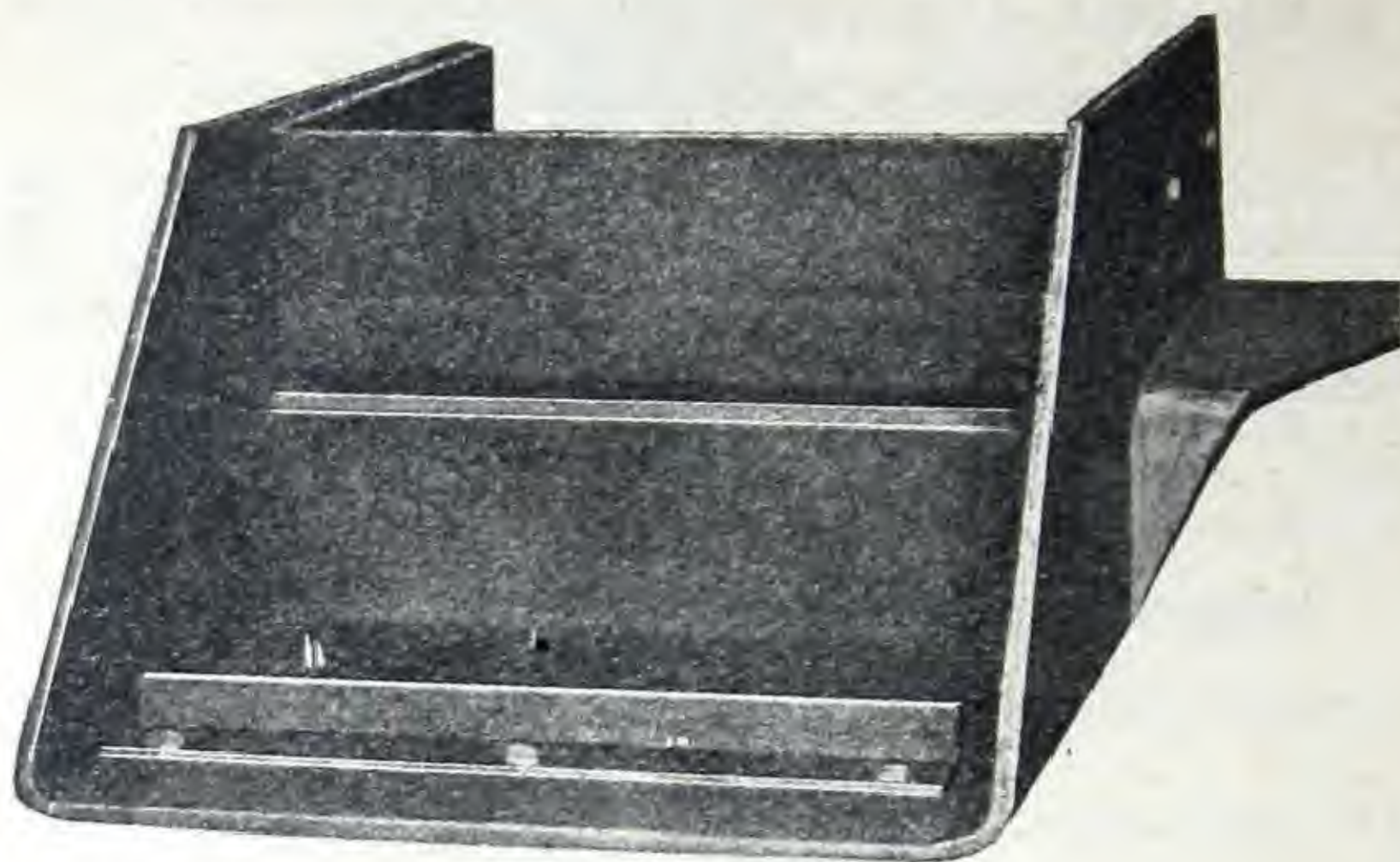
PRICE LIST DUPLEX WALL HANGERS

No.	to carry Joist	Size	Price	Ship.	Wgt.	
No. 100	to carry Joist	2 x 6 to 2 x 12	\$0.25	....	2¼ lbs.	
No. 140	"	2 x 14 to 2 x 18	.40	....	3½ "	
No. 150	"	3 x 6 to 3 x 12	.35	....	4 "	
No. 210	"	3 x 14 to 3 x 18	.55	....	5¼ "	
No. 200	"	4 x 6 to 4 x 10	.55	....	3½ "	
No. 280	"	4 x 12 to 4 x 18	.75	....	6¼ "	
No. 500	"	5 x 8 to 5 x 16	1.00	....	10 "	
No. 600	"	6 x 8 to 6 x 16	1.25	....	11½ "	
No. 800	"	8 x 8 to 8 x 14	1.50	....	13¼ "	
No. 1000	"	10 x 10 to 10 x 12	1.60	....	18 "	

Write for discounts.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Joist and Wall Hangers — *Continued*



No. 310—Extra heavy Duplex Wall Hangers for heavy Mill construction work.
Made of steel.

This hanger gives 8 inch bearing on the wall and provides for 8 inch bearing for the girder.

We carry all sizes in stock

No. 800, Extra Heavy, for	8x14	8x16	8x18	\$2.50	Ship.	Wgt.	24 lbs.
No. 1000, " "	10x14	10x16	10x18	3.00	"	"	45 "
No. 1200, " "	12x14	12x16	12x18	4.00	"	"	52 "
No. 1400, " "	14x14	14x16	14x18	5.00	"	"	55 "
No. 1600, " "	16x16	16x18	16x20	6.00	"	"	58 "

Write for discounts.

REGARDING WALL HANGERS

Kidder in his latest work on construction says:—

"In a warehouse intended to be constructed on slow burning principle the floor beams and girders should be anchored to and supported by the walls in such a way that in case the beams are burnt through the ends may fall without injuring the wall, and where large timbers are used provision should be made against the possibility of dry rot."

The hanger shown by No. 310 is made extra heavy and is provided with a plate that has 8 inches of bearing on the wall and the bearing of the timbers on the hangers is also eight inches. For beams not exceeding 10 inches in breadth there is probably little choice between box anchors and wall hangers, except perhaps in price and appearance. When the wall hanger is used no hole is left in the wall and the saving of six inches in the length of the timber is effected which in some cases would be a consideration. For girders 12 x 14 and upwards the Wall Hanger is preferable to the box anchor. Wall hangers made from stirrups should not be used for heavy beams.

When ordering or writing for prices, read carefully "Instructions to Buyers" on page 216

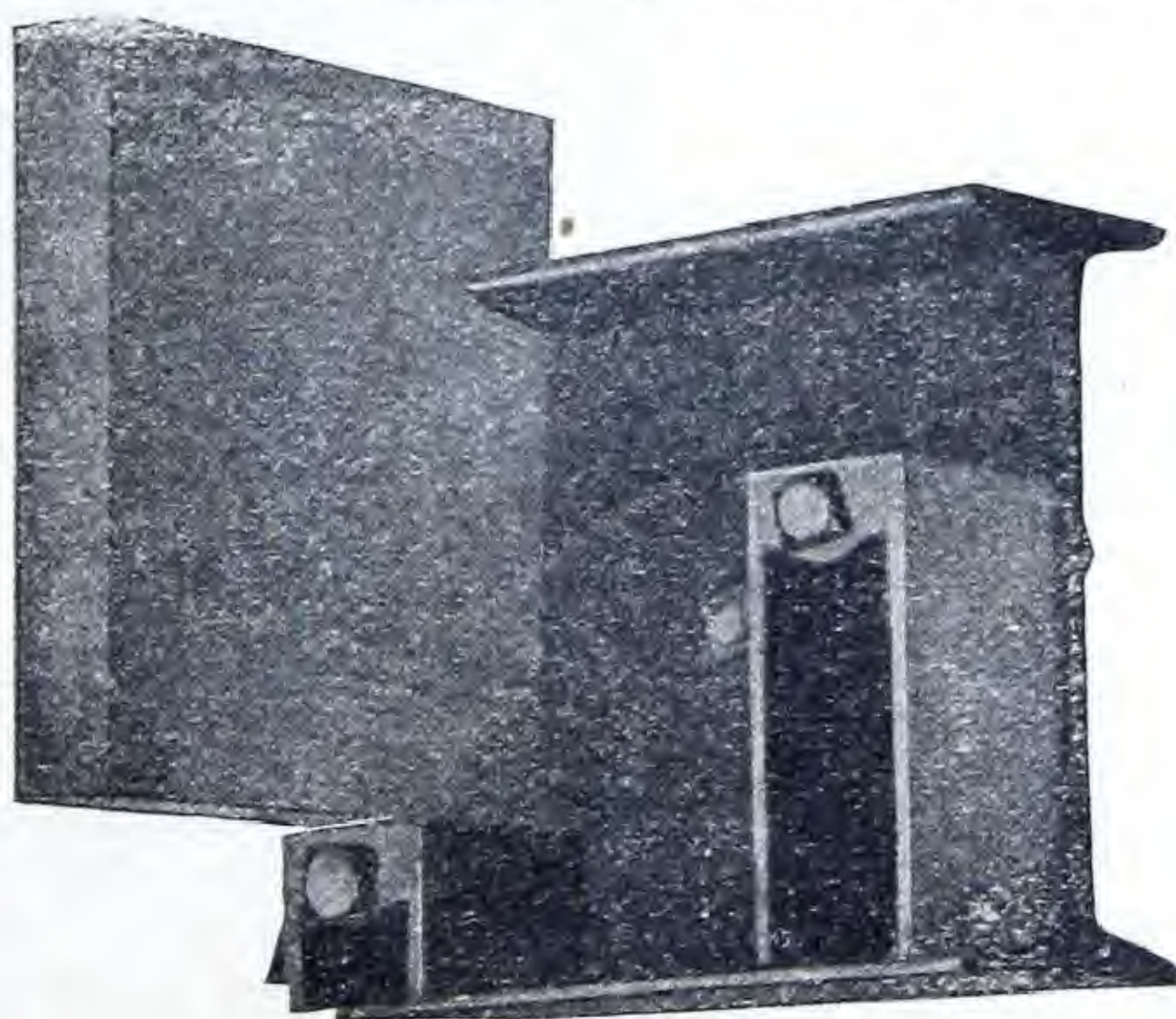
Joist and Wall Hangers — *Continued*

No. 311—Duplex I-Beam Hangers.

Duplex 1-Beam hangers fit exactly into the flange of the I-Beam. We provide for $4\frac{1}{2}$ -in. bearing of the joist on our 2-in., 3-in., 4-in. and 5-in. hangers. These hangers are made with a rib in bottom of hanger $\frac{3}{8}$ -in. high, which serves as a tie when the joist is placed in the hanger. All holes to attach Duplex I-Beam hangers to I-Beams are punched 6-in. from bottom of I-Beam.

PRICE LIST DUPLEX I-BEAM HANGERS

No. 2,	to carry Joists	2 x 6 to 2 x 16	30 cents
No. 2 $\frac{1}{2}$,	"	2 $\frac{1}{2}$ x 6 to 2 $\frac{1}{2}$ x 16	40 "
No. 3,	"	3 x 6 to 3 x 16	45 "
No. 4,	"	4 x 6 to 4 x 16	60 "
No. 5,	"	5 x 8 to 5 x 16	75 "
No. 6,	"	6 x 8 to 6 x 16	80 "
No. 7R,	Used in pairs	8 x 8 to 8 x 16	\$1.00 a pair.
No. 7L,		10 x 10 to 10 x 16	
		12 x 12 to 12 x 16	



No. 312—Duplex I-Beam Hanger to carry Joists above the lower flange of the I-Beam.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Joist and Wall Hangers — *Continued*

In construction where it is necessary to have a higher joist than I-Beam the device shown at No. 312 is absolutely the best on the market. The hanger is attached with a bolt, but all the weight is carried on the lower flange of the I-Beam. We provide for a bearing from 4 to 6 inches for the joist. The cost is much less than the riveting of an angle shelf. All sizes carried in stock. Write for prices.



No. 313—Duplex Concrete Block Hanger.

DUPLEX CONCRETE BLOCK HANGER

The new method of constructing buildings with concrete blocks has made it necessary to design a hanger for this purpose. We show above, the best hanger for concrete block construction. It is made with a larger bearing plate than our ordinary wall hangers so as to distribute the load over a greater area of the concrete block.

No. 9 to carry joists 2x6 to 2x14—25 cents	Weight 2½ lbs.
No. 11 to carry joists 3x6 to 3x14—40 cents	Weight 4 lbs.
No. 13 to carry joists 4x6 to 4x14—60 cents	Weight 5 lbs.

T-F JOIST AND WALL HANGERS

Made from highest grade malleable iron by Taylor-Forbes Co., Guelph, Ontario.

JOIST HANGERS

Same dimensions, weights and prices as "Duplex" Joist Hangers, illustrated by No. 307, page 162.

Two-Piece Joist Hangers, same dimensions, prices and weights as "Duplex." See No. 308, page 162. Extra charge for bolts. Write for discounts.

WALL HANGERS

Dimensions, sizes, weights and prices same as for "Duplex" Wall Hangers, No. 309, page 163, and No. 310, page 164. Write for discounts.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Joist and Wall Hangers — *Continued*

I-BEAM HANGERS

Dimensions, sizes and prices, same as "Duplex," No. 311, page 165; and No. 312, page 165. Write for discounts.

CONCRETE BLOCK HANGER

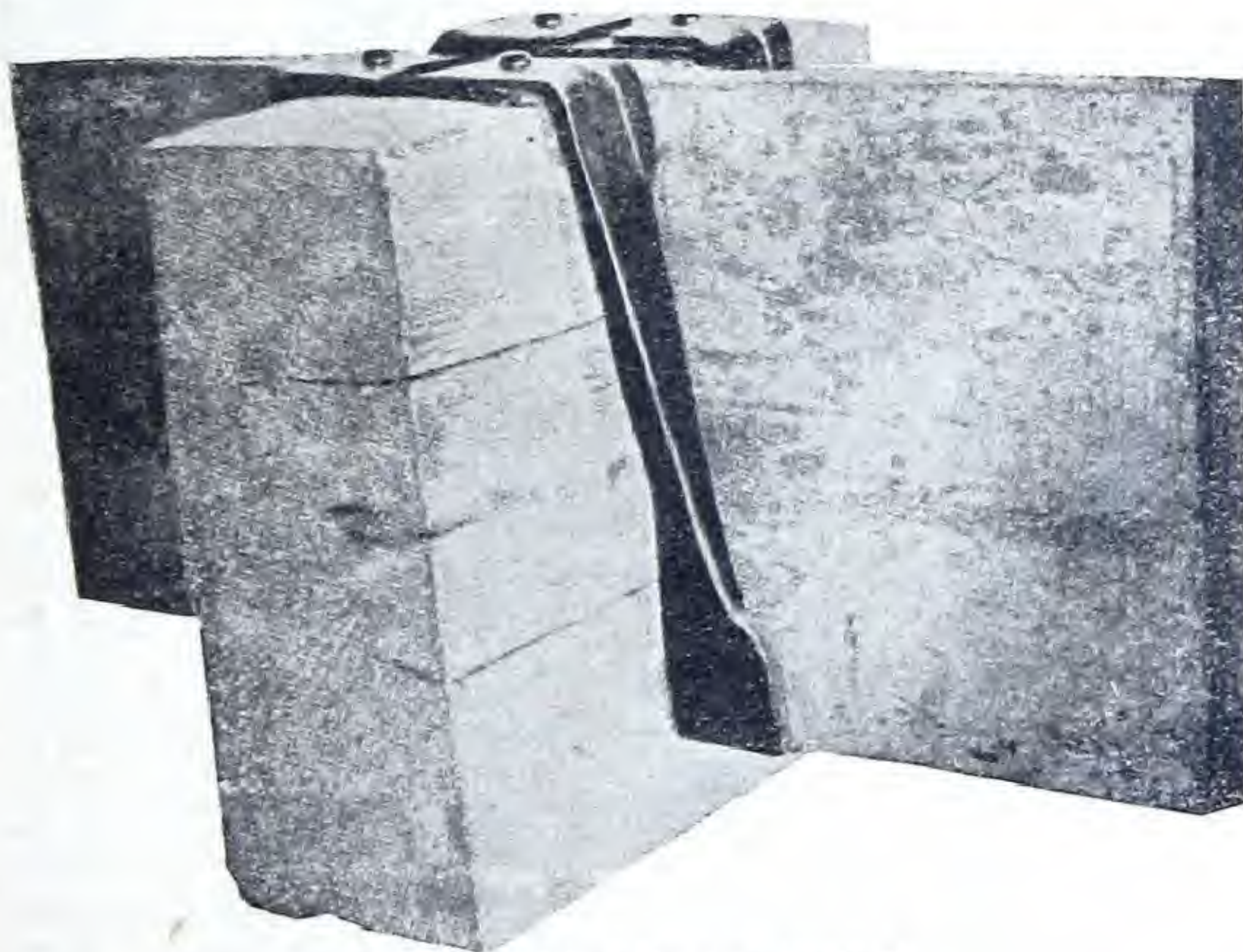
Dimensions, sizes and prices same as "Duplex," No. 313, page 166. Write for discounts.

IDEAL HANGERS, Patented

Showing Reinforcing at Corner.



No. 314—Ideal Hanger, Style A.



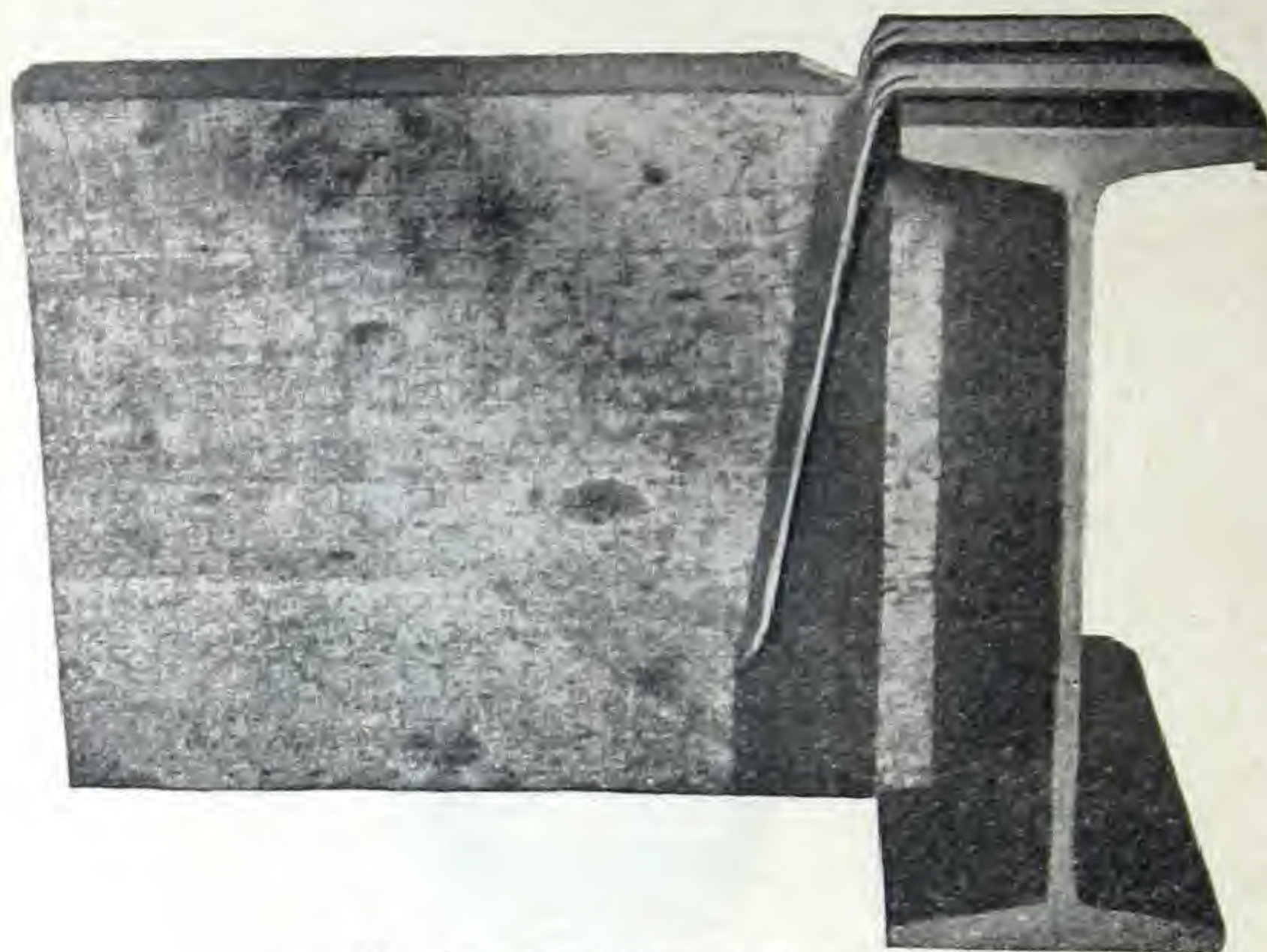
No. 315—Ideal Hanger, Style B.

It is a well known and often demonstrated fact that all the stirrup styles of joist hangers are weak at the point where they are bent to fit over the header. In the "Ideal" type, here illustrated, this weak place is reinforced and stiffened by a deep corrugation as shown plainly by No. 314, page 167. A large assortment of almost every size is carried in stock and orders can be filled promptly. Special sizes can be made up on reasonable notice.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Joist and Wall Hangers — *Continued*

IDEAL JOIST HANGER



No. 316—Ideal Hanger, Style C.

SIZES AND PRICES OF STYLE "A" IDEAL JOIST HANGER

Size of Joist	Price	Size of Joist	Price	Size of Joist	Price
2 x 6	\$0.16	4 x 8	\$0.36	8 x 10	\$0.80
2 x 8	.18	4 x 8	.38	8 x 12	1.00
2 x 10	.22	4 x 10	.40	8 x 14	1.20
2 x 12	.28	4 x 12	.46	8 x 16	1.50
2 x 14	.34	4 x 14	.54	8 x 18	2.00
2 x 16	.40	4 x 16	.75	8 x 20	2.50
2 x 18	.45	4 x 18	1.00	10 x 12	1.30
2½ x 8	.24	5 x 8	.50	10 x 14	1.50
2½ x 9	.26	5 x 9	.56	10 x 16	2.00
2½ x 10	.30	5 x 10	.64	10 x 18	2.40
2½ x 12	.32	5 x 12	.68	10 x 20	2.80
2½ x 14	.36	5 x 14	.72	12 x 12	1.50
2½ x 16	.50	5 x 16	1.00	12 x 14	2.00
2½ x 18	.60	5 x 18	1.10	12 x 16	2.40
3 x 8	.28	6 x 8	.54	12 x 18	2.60
3 x 9	.30	6 x 9	.58	12 x 20	3.00
3 x 10	.32	6 x 10	.68	14 x 14	2.20
3 x 12	.40	6 x 12	.74	14 x 16	2.60
3 x 14	.42	6 x 14	.90	14 x 18	3.00
3 x 16	.60	6 x 16	1.10	14 x 20	3.40
3 x 8	.70	6 x 18	1.30		

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

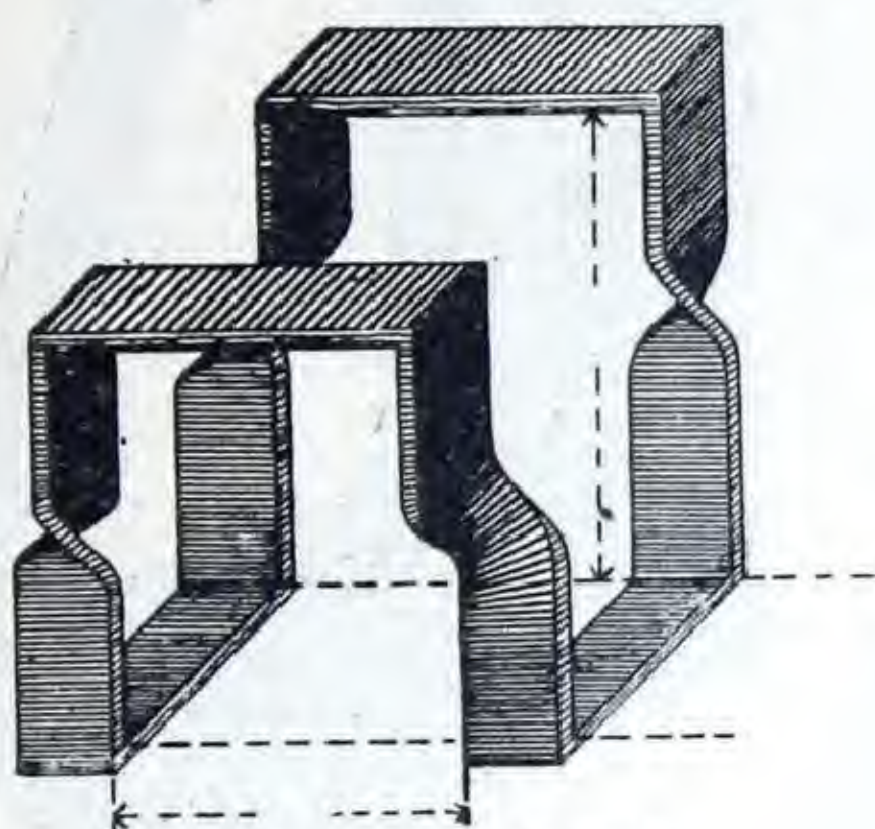
Joist and Wall Hangers — *Continued*

IDEAL JOIST HANGERS

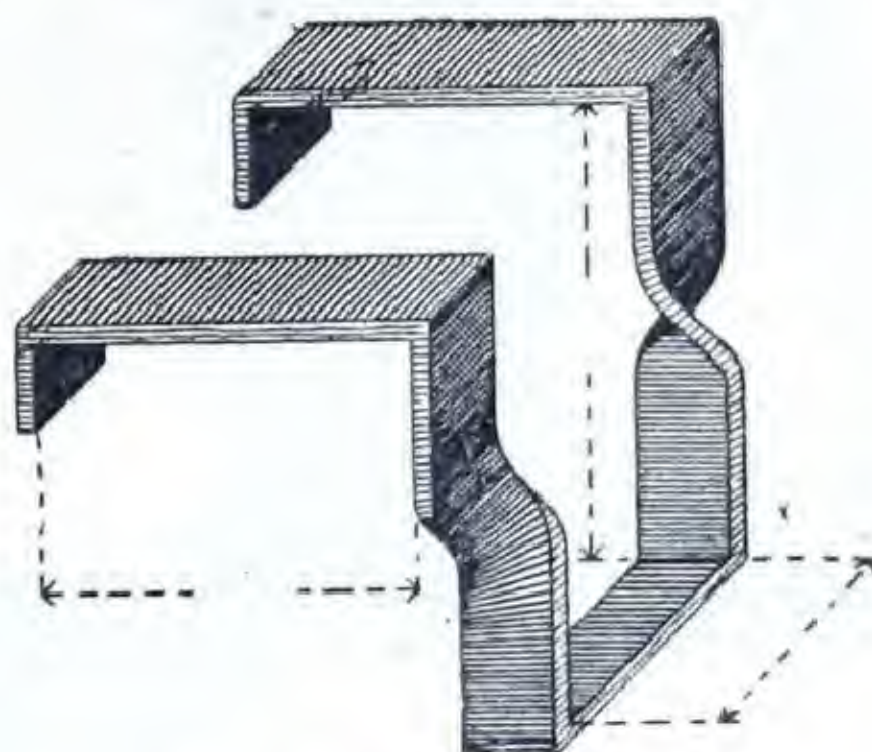
The price for the Ideal Hanger Style "B" is double the price of the single hangers, with 10 cents net added for the steel riveted strap connections over the girder, providing the girder is less than 8 inches wide and 15 cents net for girders 8 inches wide.

The Ideal Hanger Style "C" Over I-Beams. Price same as for style "A," with 10 cents net added for all hangers up to 4x16 joist. For larger size hangers add 15 cents net.

STIRRUPS, (Single and Double)



No. 317—Double Stirrup.



No. 318—Single Stirrup.

Double Stirrups are used when two beams or joists are to be framed to or carried by one girder or beam. Single stirrups are required when one joist or beam is to be framed to or carried by a girder or beam. When ordering stirrups always state the width and depth of the carrying girder as well as the joists or beams to be carried; also state whether single or double stirrups are wanted. For example, double stirrups for 8x10 joists to 8x12 girder, or if single stirrups 8x10 joist to 8x12 girder. If size of iron is not given we will furnish the proper size for the timbers specified. Stirrups are usually made of flat bar iron as shown but may also be made of round iron, which would be somewhat less expensive but not so desirable.

Stirrups are not carried in stock for the reason that they can be made up very quickly in our forge shop and orders for any number of any size can be executed promptly. We carry a large assortment of bar iron, flats and rounds from which these stirrups are made. Sometimes holes for lag screws or wire spikes for spiking stirrups to the timbers are wanted. Unless otherwise specified in the order we will always ship stirrups without holes. Stirrups are sold by weight at the base rate of \$6.00 per 100 lbs. F.O.B. Winnipeg, subject to increase or reduction depending on the number and kind required. Write for prices, giving dimensions of timbers and size of iron.

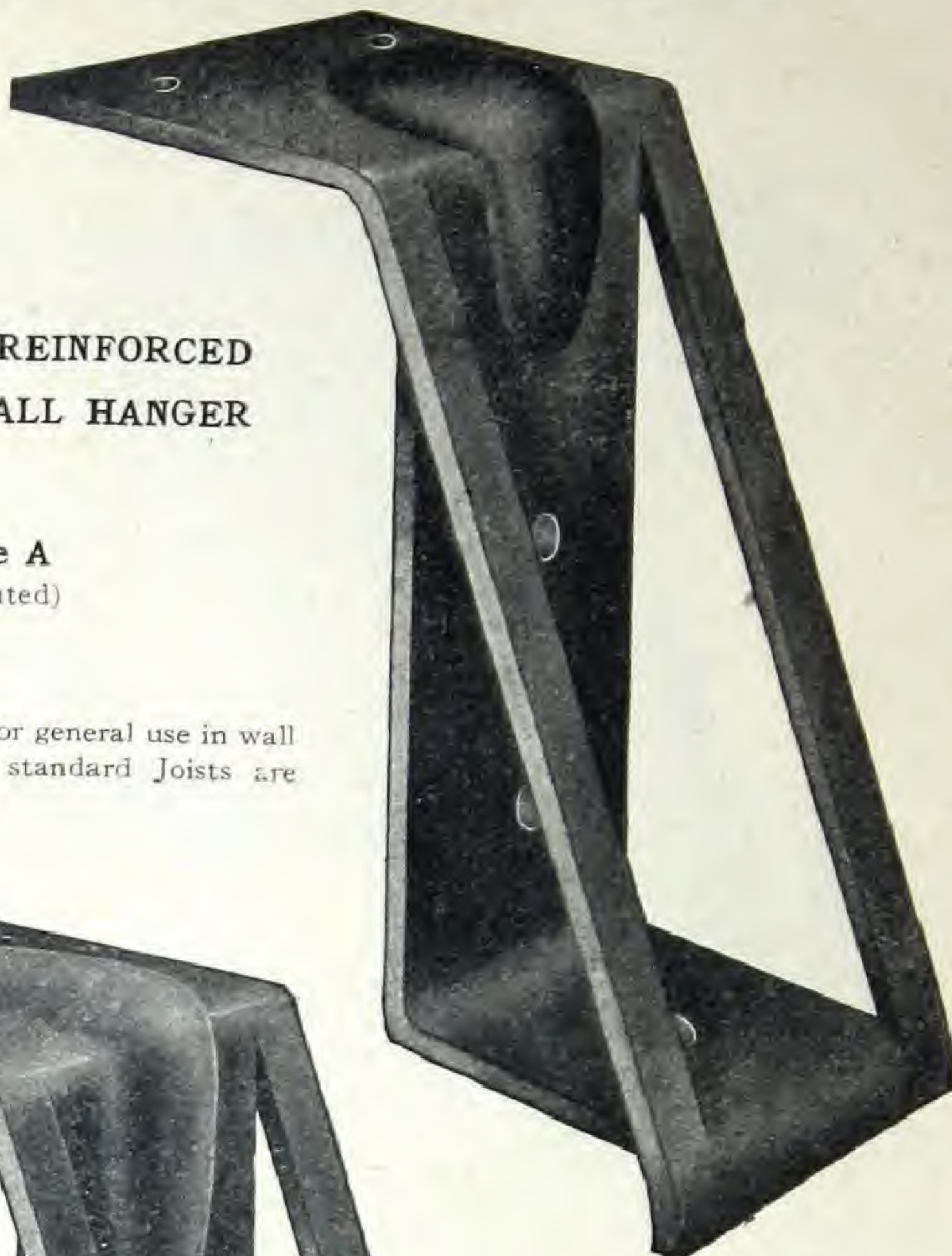
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Joist and Wall Hangers — *Continued*

"TRUS-CON" REINFORCED JOIST AND WALL HANGER

Style A
(Patented)

No. 319—Hanger is for general use in wall construction wherever standard Joists are hung to timber girders.



Style AA
(Patented)



No. 320—Same as Style A, but with bottom flat.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

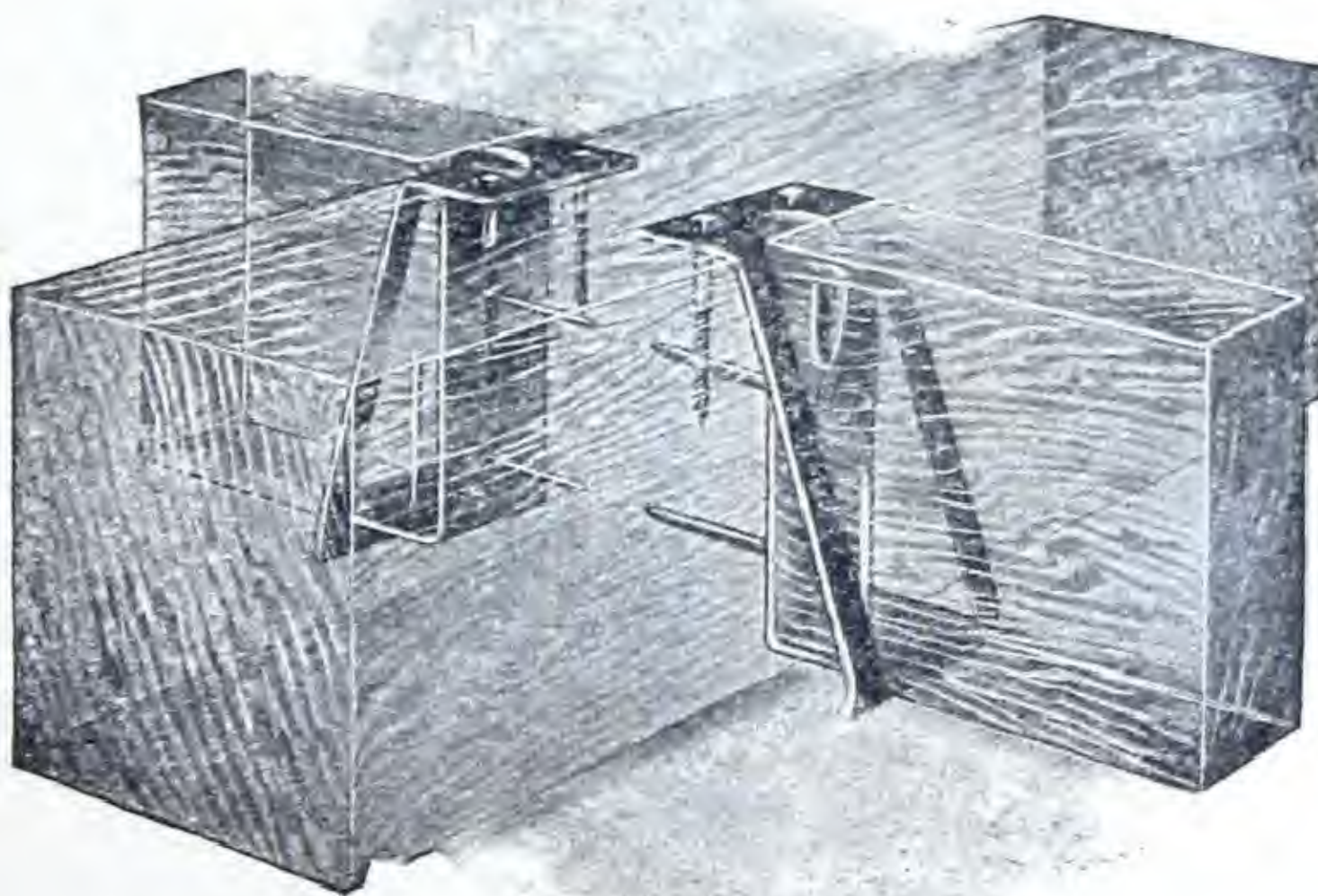
**"TRUS-CON" REINFORCED
WALL HANGER**

Style B
(Patented)

This style hanger can be furnished without the turned up end for use with concrete blocks or hollow tile walls. The top bearing plate can be made any desired length. For connection of timber to I-beams the hanger can be furnished with the end turned down to fit over the flange of the beam if width of flange is stated.

Measurements of hangers in all cases clear the top reinforcement.

No. 321

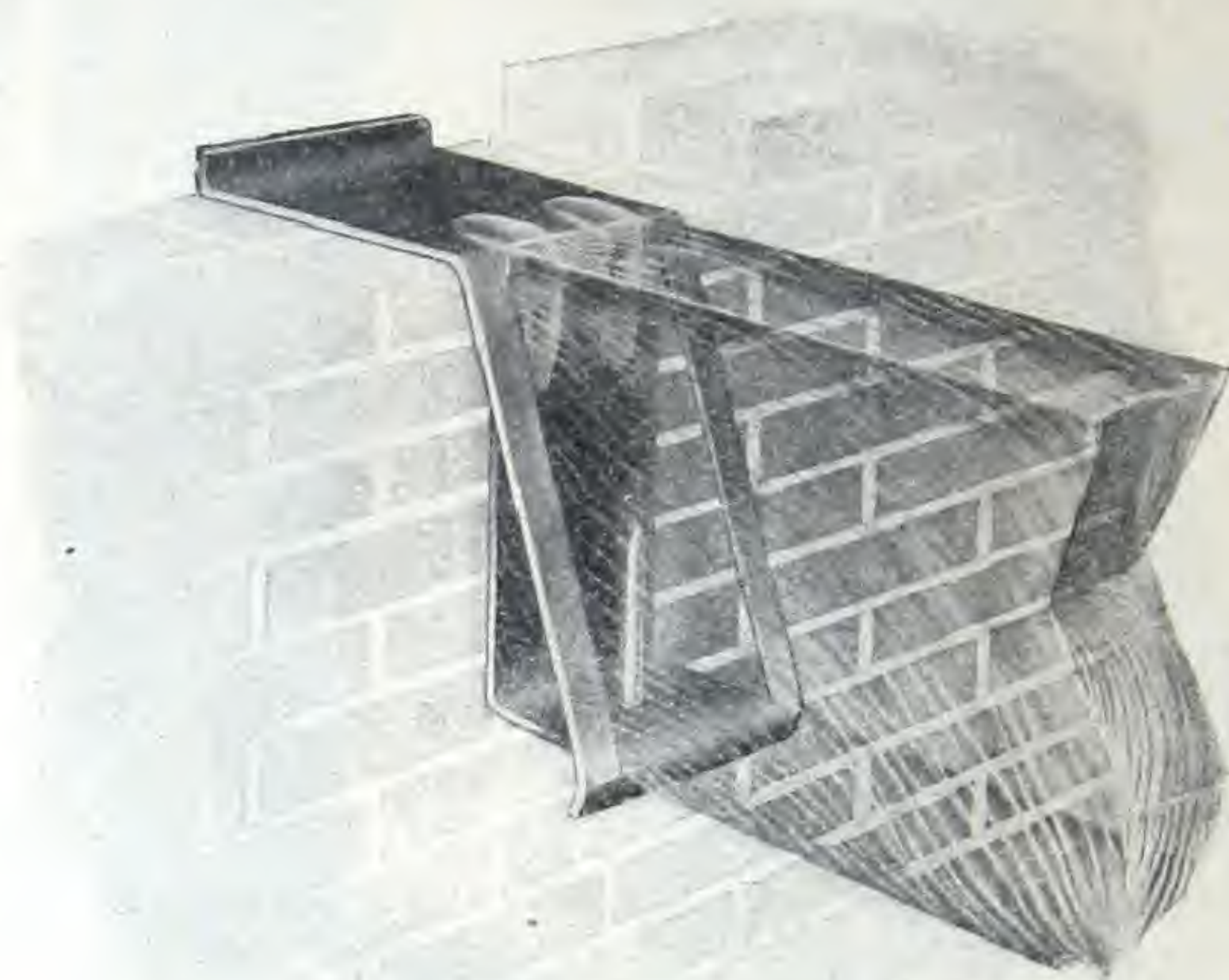


No. 322—Shows Style B in application.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

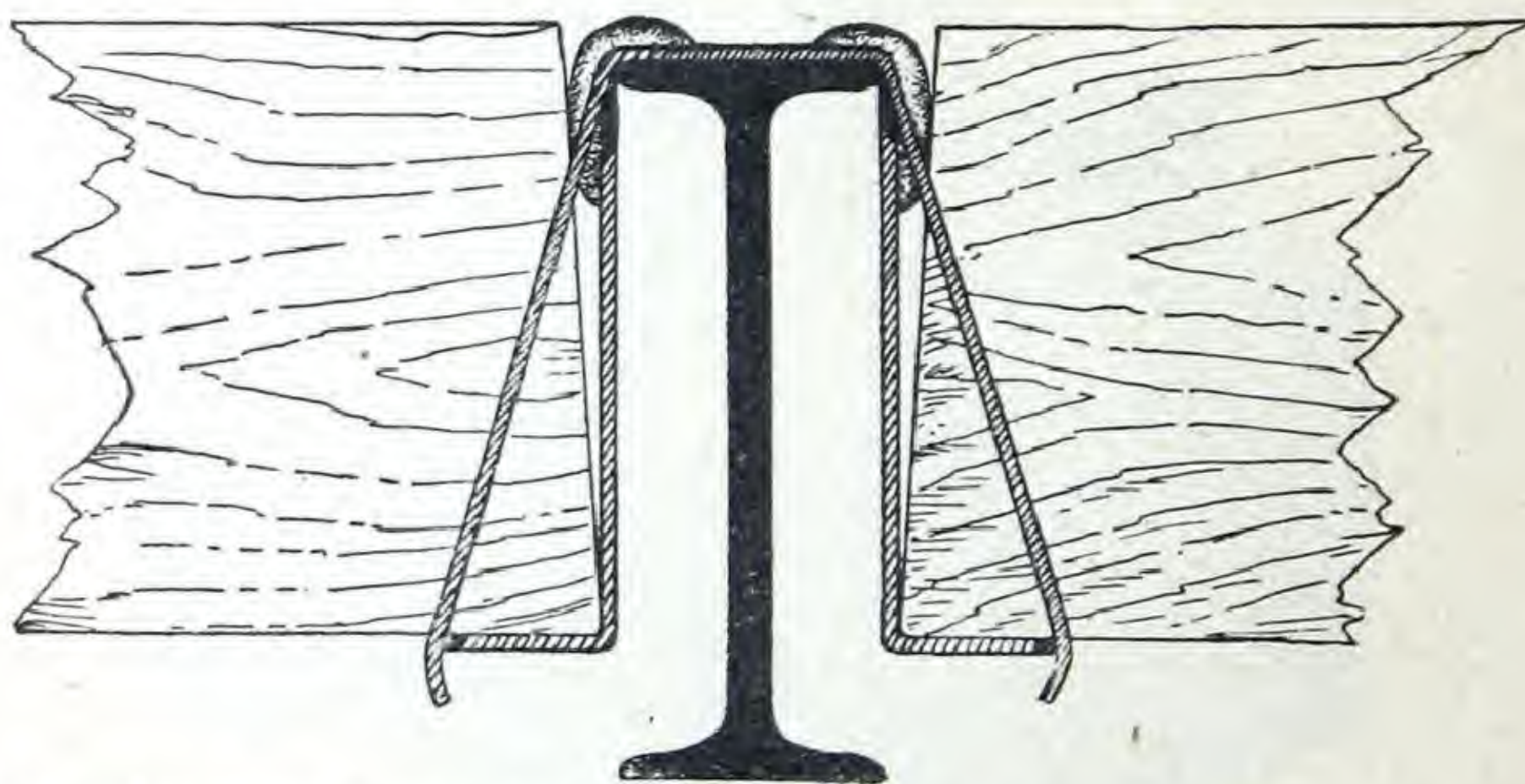
Joist and Wall Hangers — *Continued*

The distinctive features of Style "A" are preserved in Style "B," the only difference being that the top plate is extended so as to pass one or two courses of brick, insuring a secure tie to masonry without the use of additional riveted bearing plates, now so commonly used with other types.



No. 323—Shows Style A in application.

"TRUS-CON" STIRRUP HANGER



No. 324 — Shows Hanger similar to Style A, but with connecting bearing plate.
Requires no framing of Joist.

Records of Test will be furnished on application.
For prices and weights, see next page.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Joist and Wall Hangers — *Continued*

TRUS-CON REINFORCED JOIST HANGERS

STYLE "A"

Size of Joist	List Price	Length on Girder	Weight of Han- ger in lbs.	Bearing of Joist in Han- ger	Ultimate Safe Loads Uniformly Distributed for Rectangular Yellow Pine Beams Modulus of Rupture Adopted being 5,000 Lbs. SPAN					
					10 feet	12 feet	14 feet	16 feet	18 feet	20 feet
2x6	\$0.15	3 in.	1.62	2 in.	1,000	833	700	632	566	500
2x 8	.16	3 "	1.96	2½ "	1,766	1,466	1,266	1,100	966	900
2x10	.19	3 "	2.28	2½ "	2,766	2,300	1,966	1,733	1,532	1,400
2x12	.20	3 "	2.68	3 "	4,000	3,333	2,866	2,500	2,232	2,000
2x14	.23	3 "	3.02	3 "	5,432	4,532	3,900	3,100	3,032	2,732
2x16	.26	3 "	3.25	3 "						
3x 6	.25	3 "	2.15	2 "	1,500	1,250	1,050	950	850	750
3x 8	.26	3 "	2.59	2½ "	2,650	2,200	1,900	1,650	1,450	1,350
3x10	.30	3 "	3.23	2½ "	4,150	3,450	2,950	2,600	2,300	2,100
3x12	.35	3 "	3.72	2½ "	6,000	5,000	4,300	3,750	3,350	3,000
3x14	.36	3 "	4.18	3 "	8,150	6,800	5,850	5,100	4,550	4,100
4x 8	.35	3 "	3.21		3,534	2,934	2,534	2,200	1,934	1,800
4x10	.40	3 "	3.95	2 "	5,534	4,600	3,934	3,466	3,066	2,800
4x12	.50	3 "	4.55	2½ "	8,000	6,666	5,733	5,000	4,466	4,000
4x14	.50	3 "	5.14	3 "	10,866	10,066	7,800	6,800	6,066	5,466
4x16	.50	3 "			14,200	11,866	10,200	8,866	7,904	7,134
6x 8	.55	3 "	4.63	2½ "	5,300	4,400	3,800	3,300	2,900	2,700
6x10	.60	3 "	5.40	2½ "	8,300	6,900	5,900	5,200	4,600	4,200
6x12	.70	3 "	6.20	2¾ "	12,000	10,000	8,600	7,500	6,700	6,000
6x14	.85	3 "	6.97	3 "	16,300	13,600	11,700	10,200	9,100	8,200
8x 8	.90	3 "	7.61	2½ "	7,066	5,866	5,066	4,400	3,866	3,600
8x10	.95	3 "	8.88	2½ "	11,064	9,200	7,866	6,930	6,130	5,660
8x12	1.00	3 "	10.36	2¾ "	16,000	13,300	11,460	10,000	8,934	8,000
8x14	1.10	3½ "	12.12	3 "	21,728	18,130	15,600	13,600	12,134	10,934
8x16	1.10	3½ "	13.43	3½ "	28,400	23,734	20,400	17,728	15,808	14,276
10x12	1.10	3½ "	13.45	2¾ "	20,000	16,666	14,330	12,500	11,160	10,000
10x14	1.10	3½ "	14.87	3 "	27,160	22,600	19,500	17,000	15,160	13,600
10x16	1.40	3½ "	16.55	3½ "	35,500	29,600	25,500	22,160	19,760	17,830
12x14	1.50	3½ "	18.50	3 "	32,600	27,200	23,400	20,400	18,200	16,400
12x16	1.60	3½ "	20.45	3½ "	42,600	35,600	30,600	26,600	23,800	21,400
12x18	1.70	4 "	22.71	4 "	50,000	42,200	37,100	32,000	28,800	25,000
14x16	1.80	4 "	23.41	3½ "	49,700	41,524	35,700	31,000	27,664	24,966
14x18	1.57	4 "	25.65	4 "	59,000	50,000				

Write for Discounts. Prices for Style "AA." All sizes up to 4x16, add 1 cent to above list prices; all sizes above 4x16, add 2 cents to above list prices.

The Trus-Con Hangers are the most up-to-date and best on the market. Considerable reductions from the above prices will be made on orders of 100 or more. These hangers have been used in some of the largest buildings in Winnipeg and have given the greatest satisfaction. Send us your lists and we will quote a lump sum price for any number of these hangers on cars at your station.

Joist and Wall Hangers — *Continued*

TRUS-CON REINFORCED JOIST HANGERS

STYLE "B"

PRICE LIST

Size of Joist	List Price	Length in Ma- sonry	Weight of Han- ger in lbs.	Bearing of Joist in Han- ger	Ultimate Safe Load Uniformly Distributed for Rectangular Yellow Pine Beams, the Mo- dulus of Rupture Adopted being 5,000 Lbs.					
					SPAN					
					0 feet	12 feet	14 feet	16 feet	18 feet	20 feet
2x 6 / 2x 8 }	\$0.30	4½ in.	2.30	2½ in.	{ 1,000 1,766	833 1,466	700 1,266	632 1,100	566 966	500 900
2x10 } 2x12 } 2x14 } 2x16 }	.35	4½ "	3.02	3 "	{ 2,766 4,000 5,432	2,300 3,333 4,532	1,966 2,866 3,900	1,733 2,500 3,100	1,532 2,232 3,032	1,400 2,000 2,732
3x 6 / 3x 8 }	.35	4½ "	3.05	2½ "	{ 1,500 2,650	1,250 2,200	1,050 1,900	950 1,650	850 1,450	750 1,350
3x10 } 3x12 } 3x14 }	.40	4½ "	4.18	2½ "	{ 4,150 6,000 8,150	3,450 5,000 6,800	2,950 4,300 5,850	2,600 3,750 5,100	2,300 3,350 4,550	2,100 3,000 4,100
4x 8	.40	4½ "	3.77	2 "	3,534	2,934	2,534	2,200	1,934	1,800
4x10 } 4x12 } 4x14 } 4x16 }	.50	4½ "	5.12	2½ "	{ 5,534 8,000 10,866 14,200	4,600 6,666 10,066 11,866	3,934 5,733 7,800 10,200	3,466 5,000 6,800 8,866	3,066 4,466 6,066 7,904	2,800 4,000 5,466 7,134
6x 8	.60	4½ "	5.40	2½ "	5,300	4,400	3,800	3,300	2,900	2,700
6x10 } 6x12 } 6x14 }	.80	8½ "	8.76	2½ "	{ 8,300 12,000 16,300	6,900 10,000 13,600	5,900 8,600 11,700	5,200 7,500 10,200	4,600 6,700 9,100	4,200 6,000 8,200
8x 8 8x10	1.10	8½ "	13.10	2½ "	{ 7,066 11,064	5,866 9,200	5,066 7,866	4,400 6,930	3,866 6,130	3,600 5,660
8x12 } 8x14 } 8x16 }	1.20	8½ "	15.92	3 "	{ 16,000 21,728 28,400	13,300 18,130 23,734	11,460 15,600 20,400	10,000 13,600 17,728	8,934 12,134 15,808	8,000 10,934 14,266
10x12 } 10x14 } 10x16 }	1.25	8½ "	19.81	3 "	{ 20,000 27,160 35,500	16,666 22,600 29,600	14,330 19,500 25,500	12,500 17,000 22,160	11,160 15,160 19,760	10,000 13,600 17,830
12x14 } 12x16 } 12x18 }	1.50	8½ "	25.63	3½ "	{ 32,600 42,600 50,000	27,200 35,600 42,200	23,400 30,600 37,100	20,400 26,600 32,000	18,200 23,800 28,000	16,400 21,400 25,000
14x16 / 14x18 }	1.80	8½ "	29.34	3½ "	{ 49,700 59,000	41,524 50,000	35,700	31,000	27,664	24,966

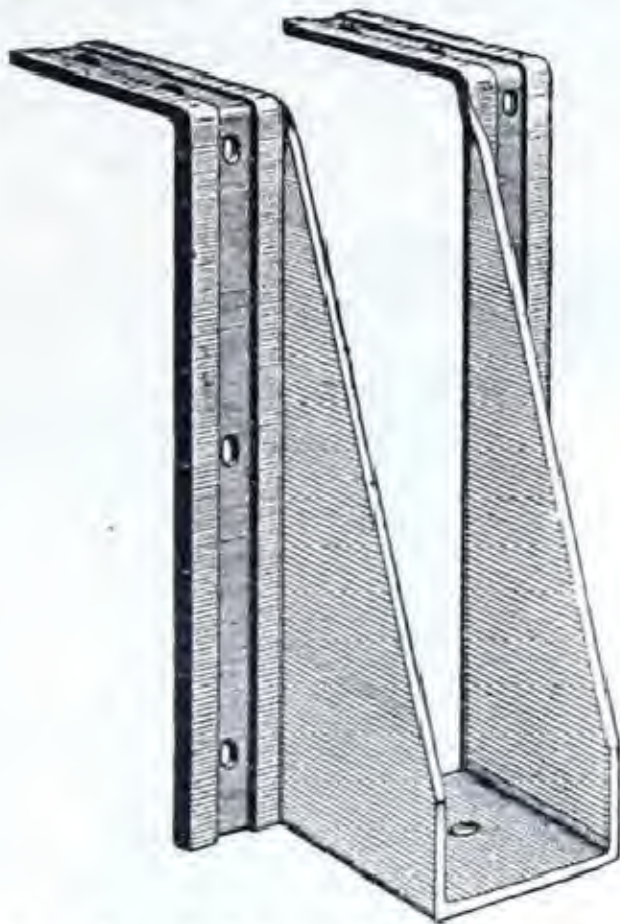
Write for Discounts. Prices for Style "BB." All sizes up to 4 x 16, add 1 cent to above list prices; all sizes above 4 x 16, add 2 cents to above list prices.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Joist and Wall Hangers — *Continued*

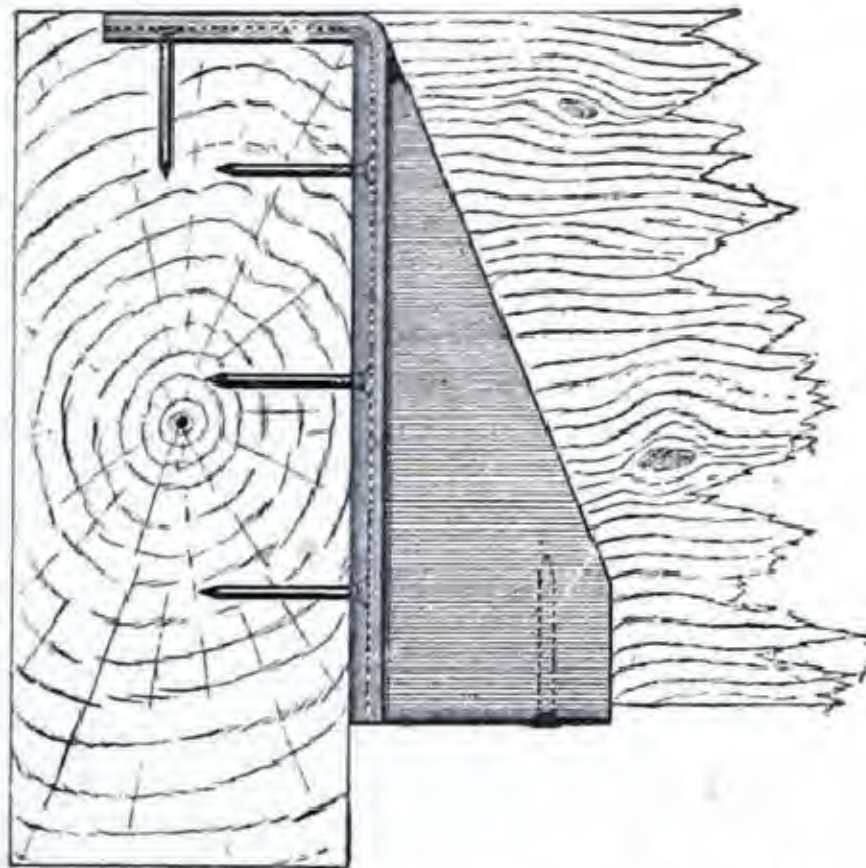
THE VAN DORN STEEL JOIST HANGERS

The Van Dorn Hangers are forged from rolled steel, having a guaranteed ultimate tensile strength of 56,000 lbs. per square inch; each hanger will carry six times more than will be required in actual use. It is easily applied, the hook fitting over the top of the header, and notched in so as to come level. It is held in place by two heavy wire nails. The flanges fitting on the sides of the header may be spiked if preferred. This is not essential, but is an improvement, as it holds the hanger solidly in place. The joist may be nailed through hole in bottom of hanger if desired. This hanger insures the full strength of the header and joist.



No. 325—Regular Steel Joist Hanger for Wood Header.

We manufacture a 6-inch hanger for a 6-inch joist, an 8-inch hanger for an 8-inch joist, etc., etc., insuring uniformity and an improved appearance when different sizes of joists are used in the same building, which is important and a great improvement over duplicate hangers made for three or more depths of joists.



No. 326—Shows Hanger spiked to Wood Header.

In the Van Dorn Steel Joist Hanger we are sure that we have an article that is durable and cheap and at the same time simple and economical. The old method of framing by mortise and tenon is slow and unsatis-

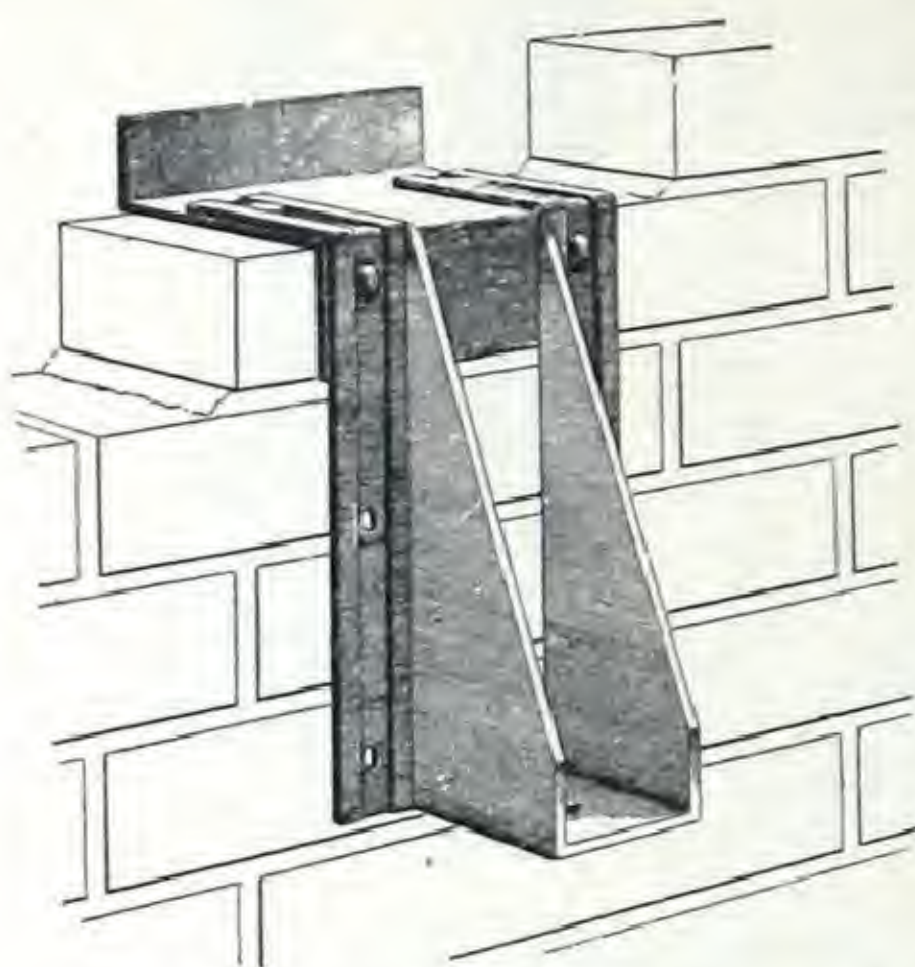
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Joist and Wall Hangers — *Continued*

factory, and dependent greatly upon skilled labor for good workmanship; whereas with the Steel Joist Hanger the most inexperienced workman can apply it with the best results.

The importance of spiking hangers to the headers, as shown, should not be underestimated, as it provides a quick and cheap way of attaching, which is very substantial and gives the full strength of the header without regard to season cracks. It also provides a good bearing for the joist.

Note that the flanges forming the side and top of the hanger are wrought with a groove in the center so as to let the spike head go in level. It also greatly stiffens the flange where the angle at the top is formed. Wire nails are generally used, and when spiked in place the header is thoroughly tied together, so any season cracks will not affect its strength. Note that the joist is held at the bottom by a wire nail, so that in case of fire inside the



No. 327—Partition or Wall Hanger.

building, the joist will fall down without damaging any of the headers or walls. Note that the side flanges of these hangers are $1\frac{1}{2}$ inches, and you therefore get 3-inch bearing on the top of the header as well as the advantage of spiking the side flanges. The joists have to be squared off only, requiring no framing whatever. This hanger can be put on by much cheaper labor than is required to properly frame and tenon a joist in the old way.

Note particularly that steel hangers are used advantageously in connecting joist with stair headers, headers around chimneys, and on all joist connections to wall or wood headers. They are used very advantageously in wood roof construction, as they increase the value of the structure. Lighter headers can be used with this hanger than with any other.

One of the most valuable and important uses of the steel hanger is in connection with partition or outside walls. It not only anchors the walls together, but in case of fire, when the interior is burned out, leaves the walls intact without bulging, and the joist can be replaced without changing the hanger. The importance of this feature is appreciated by Insurance Companies who recognize it in the rates on buildings.

The Van Dorn Hanger is the most adaptable for concrete building block construction. As observable in cut No. 328, the same Hanger used on the wood header, No. 325, is used for the concrete block with the additional plate riveted as shown, being similar to that used for hanger for brick wall except that the

Joist and Wall Hangers — *Continued*

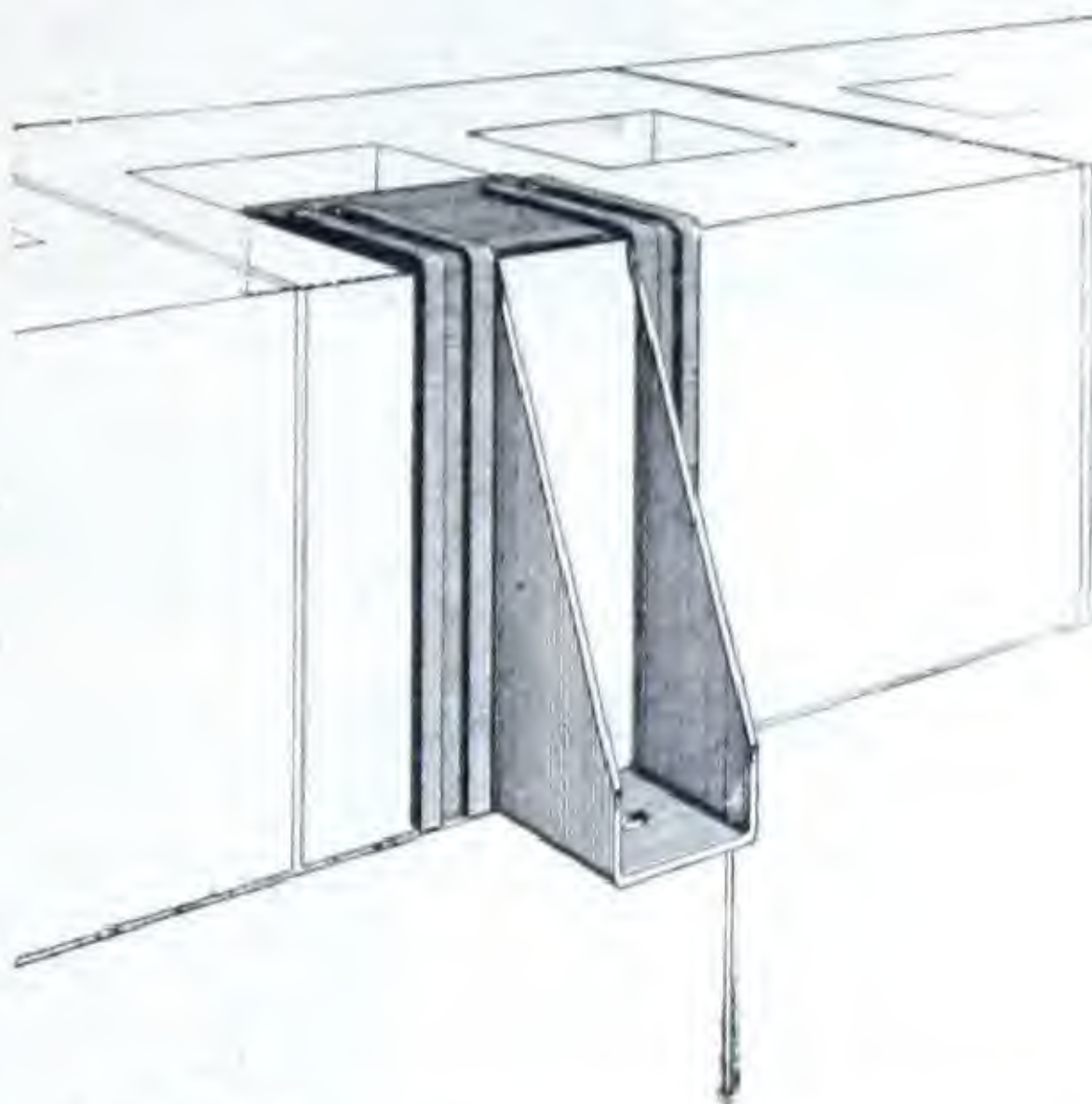
back flange of plate is turned down and the depth of plate is made the thickness of the outer shell of concrete block.

The riveted plate makes the strongest possible hanger for this purpose and gives large bearing surface on the concrete block, thus distributing the weight imposed on hanger and eliminating the danger of crushing the corners of concrete blocks.

PRICES

The prices of hangers for concrete building block construction are the same as for hangers for brick wall. See page 176, No. 327.

The Van Dorn Wall Hanger is laid in the wall by the mason and presents a large bearing on the brick work, which for ordinary joist takes in one row of brick or 4 inches. Where extra heavy timber is required we extend the bearing plate 8 inches so as to take in two rows of brick.



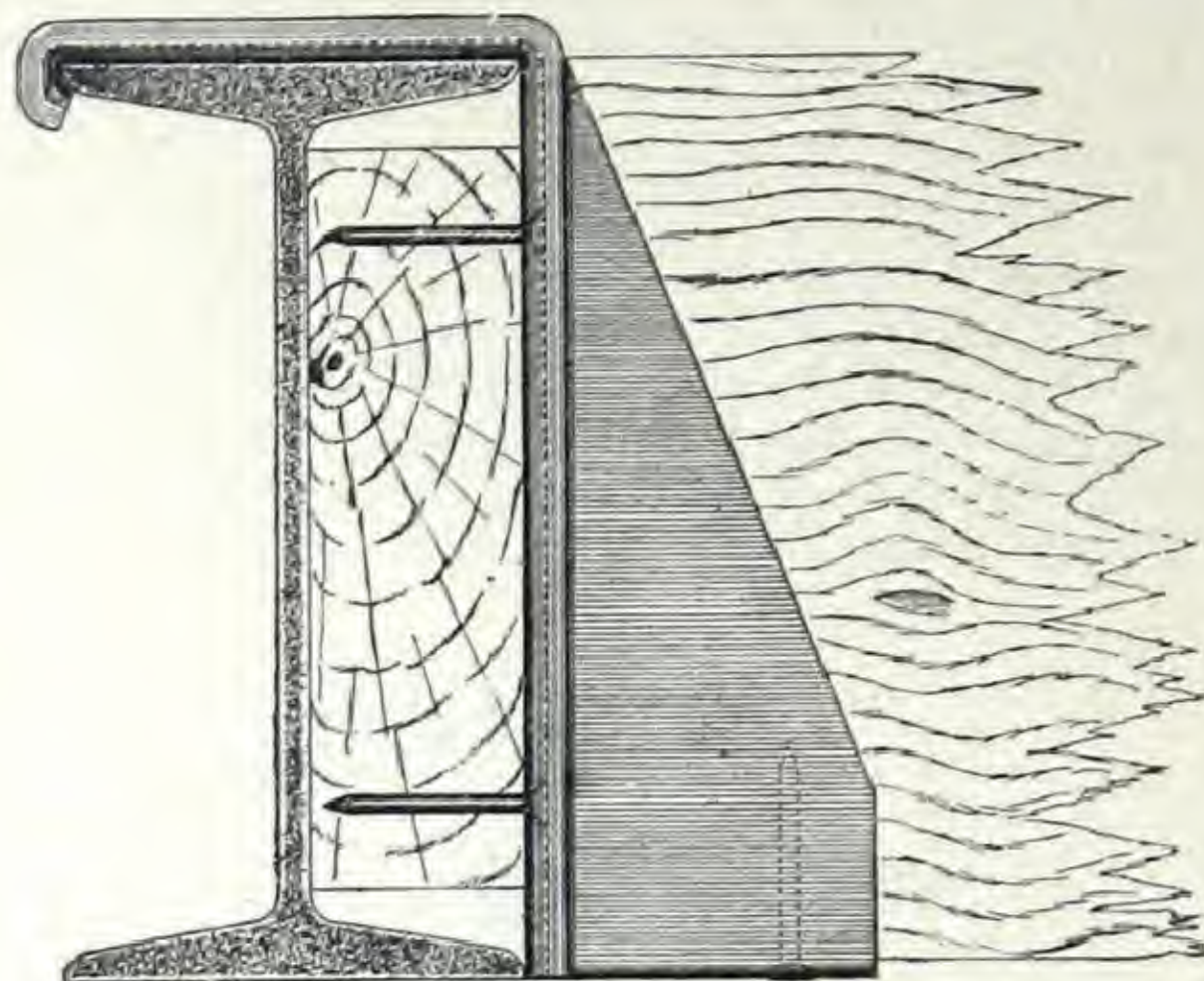
No. 328—Steel Joist Hanger for concrete blocks.

Where party walls are used the top plate is perforated so it can be bolted if required, although this is not necessary, as the joists will hold the wall when spiked to the hanger. The convenience and ease of conversion of the regular and wall hanger for either purpose is important. Note particularly that there is no breakage in shipment or handling, and that the hangers are very neat in appearance, and make a first-class workmanlike job.

When figuring this Single Hanger for concrete block walls, calculate it on same basis as a Wall Hanger No. 327 of same size; the Wall Hanger Price List, therefore, will govern the price of No. 328 Hangers.

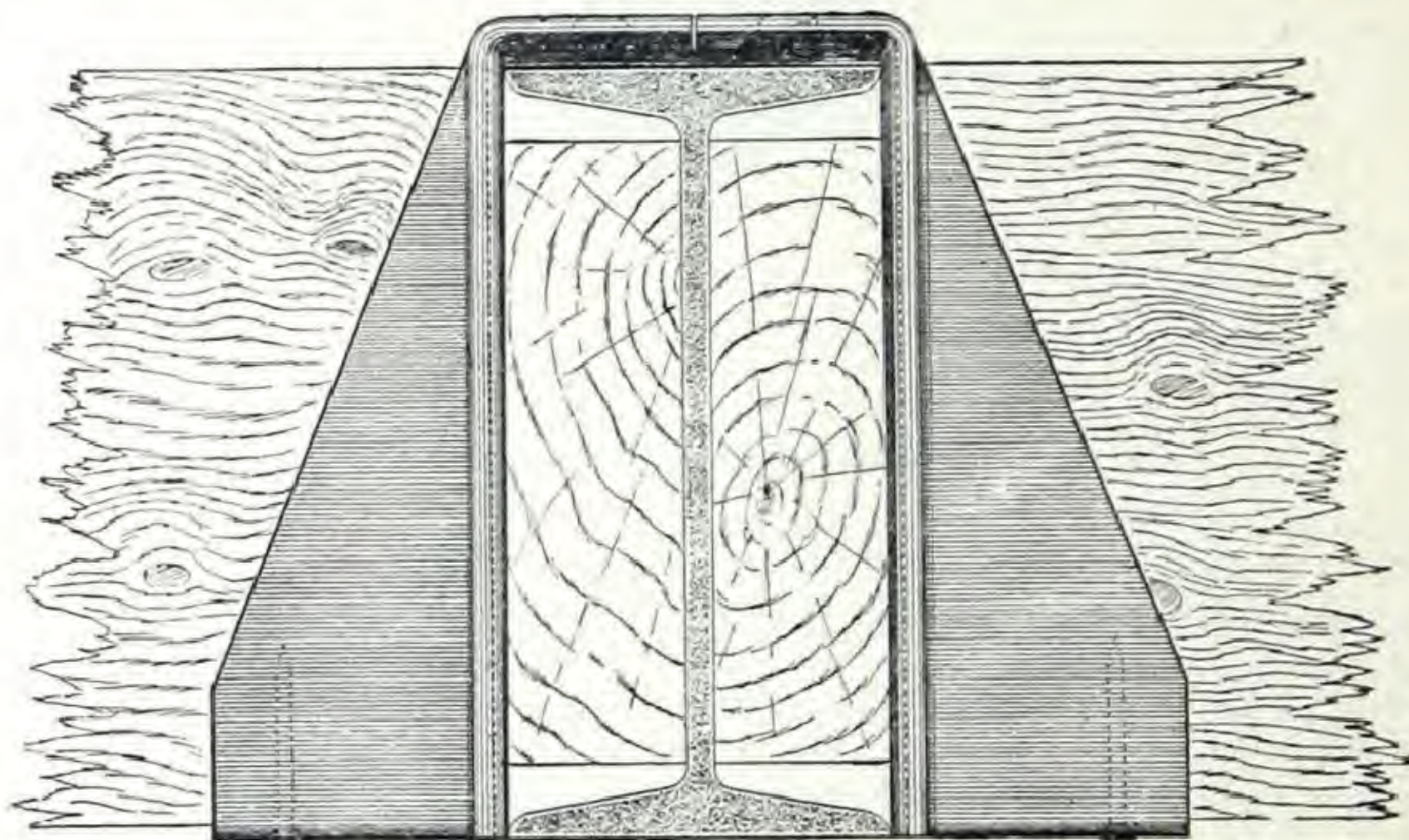
Joist and Wall Hangers --- *Continued*

The following cuts, Nos. 329 and 330, show our Hanger adapted to an "I" beam header. Two ordinary standard Hangers are simply riveted to steel straps for the No. 330 Hanger, and thus transformed into a stirrup where the joist runs on both sides of the "I" beam header. When only on



No. 329—Van Dorn Steel Joist Hangers

one side, the hanger is arranged with riveted bearing plate made to lap over the flange, as is seen in the No. 329 Hanger. It can be spiked to the wood piece between the "I" beam and the joist. It is easily put on and is perfectly reliable for at least four times the weight that any joist will stand.



No. 330—Van Dorn Double Hanger

ORDERING —In ordering hangers always state thickness and height of joist to be used, and if for wood, wall or "I" beam headers, to prevent mistakes.

In ordering Hangers Nos. 329 and 330 always state thickness and height of joist to be used, also size of girder and its overall measurement across top, so the steel strap connections between the two hangers as concerns No. 330 and the special extension overlapping steel plate as concerns No. 329 can be made accordingly.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Joist and Wall Hangers — *Continued*

PRICE LIST OF VAN DORN HANGERS—REGULAR SIZES

SIZE	WEIGHT	PRICE
2 x 6 inch joist	2 lbs. 8 oz.	\$0.35
2 x 8 "	2 " 13 "	.38
2 x 10 "	3 " 8 "	.40
2 x 12 "	4 " 3 "	.43
2 x 14 "	5 " 0 "	.45
2 x 16 "	5 " 12 "	.48
2 x 18 "	6 " 12 "	.52
3 x 6 "	2 " 10 "	.40
3 x 8 "	3 " 9 "	.45
3 x 10 "	4 " 4 "	.48
3 x 12 "	5 " 0 "	.50
3 x 14 "	5 " 10 "	.53
3 x 16 "	6 " 4 "	.55
3 x 18 "	7 " 0 "	.60
4 x 6 "	3 " 8 "	.45
4 x 8 "	4 " 12 "	.50
4 x 10 "	5 " 10 "	.55
4 x 12 "	6 " 13 "	.60
4 x 14 "	7 " 10 "	.65
4 x 16 "	8 " 8 "	.70
4 x 18 "	10 " 0 "	.75
5 x 8 "	7 " 0 "	.65
5 x 10 "	8 " 0 "	.70
5 x 12 "	9 " 0 "	.75
5 x 14 "	9 " 12 "	.80
5 x 16 "	10 " 8 "	.85
5 x 18 "	12 " 0 "	.95
6 x 8 "	8 " 0 "	.85
6 x 10 "	8 " 12 "	.93
6 x 12 "	9 " 8 "	1.00
6 x 14 "	10 " 4 "	1.08
6 x 16 "	11 " 0 "	1.15
6 x 18 "	12 " 8 "	1.25
8 x 8 "	10 " 0 "	1.00
8 x 10 "	11 " 0 "	1.10
8 x 12 "	11 " 14 "	1.20
8 x 14 "	12 " 3 "	1.30
8 x 16 "	13 " 0 "	1.40
8 x 18 "	14 " 0 "	1.55
10 x 10 "	11 " 0 "	1.30
10 x 12 "	12 " 0 "	1.40
10 x 14 "	13 " 8 "	1.50
10 x 16 "	15 " 2 "	1.60
10 x 18 "	17 " 0 "	1.75
12 x 12 "	14 " 0 "	1.50
12 x 14 "	51 " 0 "	1.60
12 x 16 "	15 " 12 "	1.70
12 x 18 "	17 " 0 "	1.80
14 x 14 "	17 " 0 "	1.90
14 x 16 "	19 " 0 "	2.05
14 x 18 "	21 " 0 "	2.20

Can make hangers any special sizes to order, which, however, requires additional labor, and when figuring hanger for odd or fractional width or depth joists and timber, add 15 per cent. to the list price of hanger next larger in size. Write for discounts.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Joist and Wall Hangers — *Continued*

PRICE LIST OF VAN DORN WALL HANGERS

Also Hangers for Concrete Blocks

(See cuts Nos. 327 and 328)

Wall Hangers for 2-inch joist, 10 cents each extra to price of regular Hangers.

Wall Hangers for 2½-inch joist, 12 cents each extra to price of regular Hangers.

Wall Hangers for 3-inch joist, 12 cents each extra to price of regular Hangers.

Wall Hangers for 4-inch joist, 15 cents each extra to price of regular Hangers.

Wall Hangers for 5-inch joist, 25 cents each extra to price of regular Hangers.

Wall Hangers for 6-inch joist, 30 cents each extra to price of regular Hangers.

Wall Hangers for 8-inch joist, 40 cents each extra to price of regular Hangers.

Wall Hangers for 10-inch joist, 60 cents each extra to price of regular Hangers.

Wall Hangers for 12-inch joist, 70 cents each extra to price of regular Hangers.

Wall Hangers for 14-inch joist, 80 cents each extra to price of regular Hangers.

NOTE—Wall Hangers for 2, 3 and 4-inch joists have 4-inch deep wall plates, and for heavier timber 8-inch, unless otherwise ordered.

Plates for Hangers for Concrete Blocks are made of depth to conform with thickness of outer shell of concrete block.

NO. 328 HANGERS

When figuring this Single Hanger, calculate it on same basis as a wall hanger No. 327 of same size; the wall hanger price list, therefore, will govern the price of No. 328 Hangers.

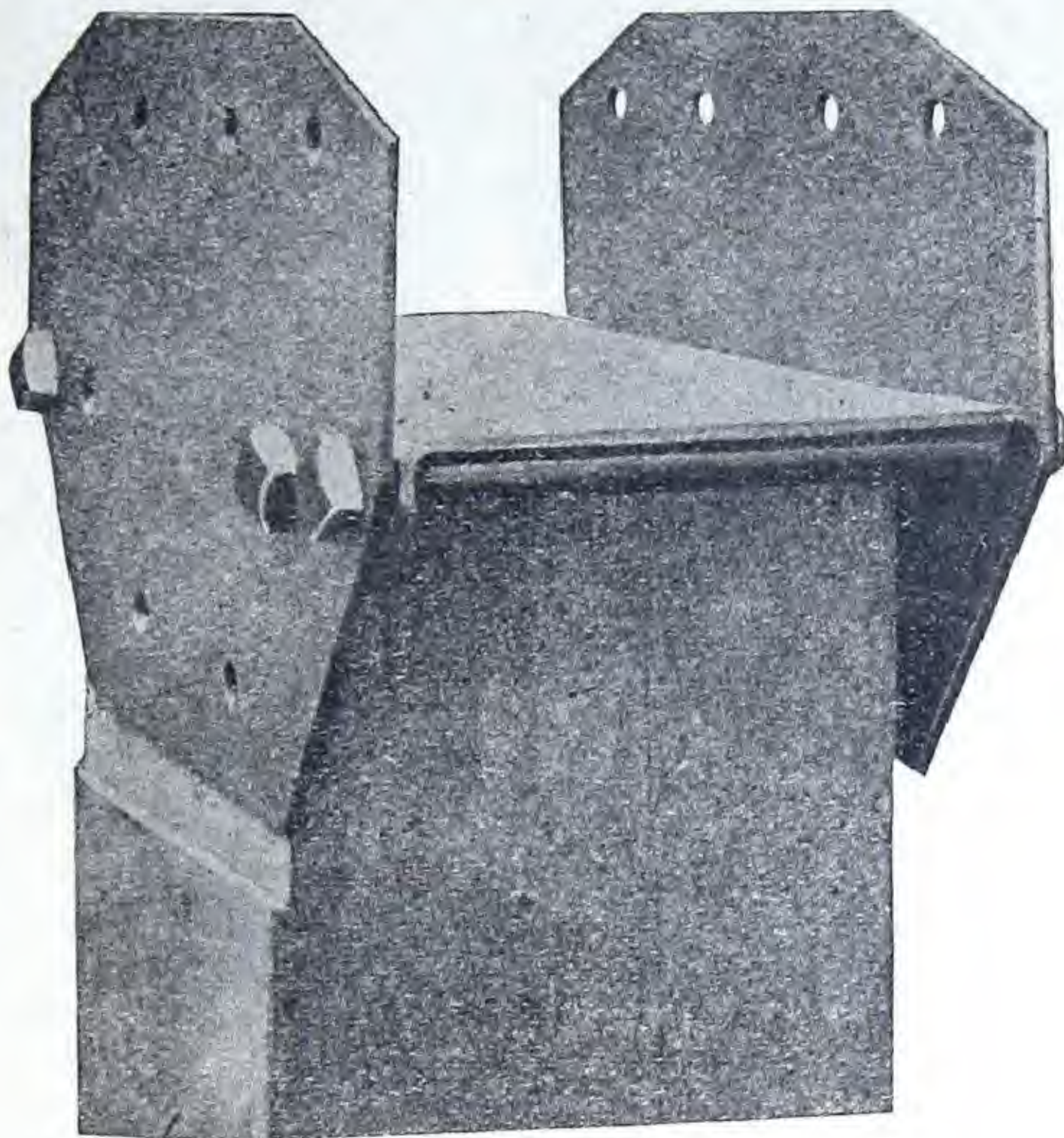
NO. 330 HANGERS

When figuring the Double Hanger, calculate it as two regular hangers, adding 10 cents extra for the steel riveted strap connections for steel girders with flange or top measurement across of 7 inches and under; and 15 cents net if girder which this double hanger straddles is wider across flange or top than 7 inches.

Post Caps and Bases

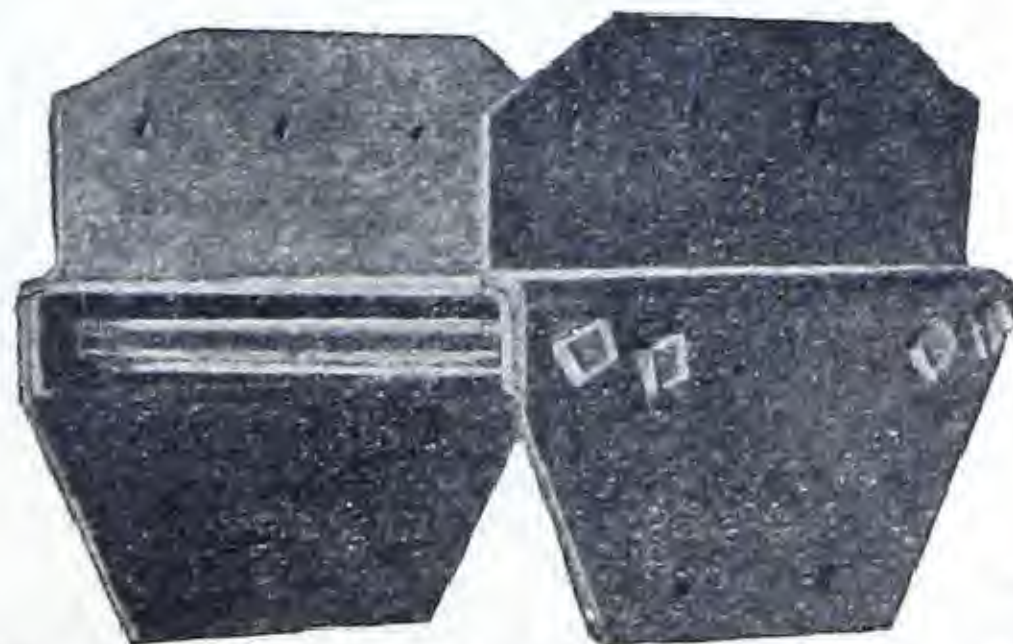
There are a number of different kinds of Post Caps and Bases in general use at the present time, the best known being the "Duplex," "Ideal," "Van Dorn" and "Atlas," some of which have special features. We sell Post Caps and Bases of the styles mentioned and many others. Ordinary sizes can be shipped from stock promptly.

DUPLEX POST CAPS (Patented)



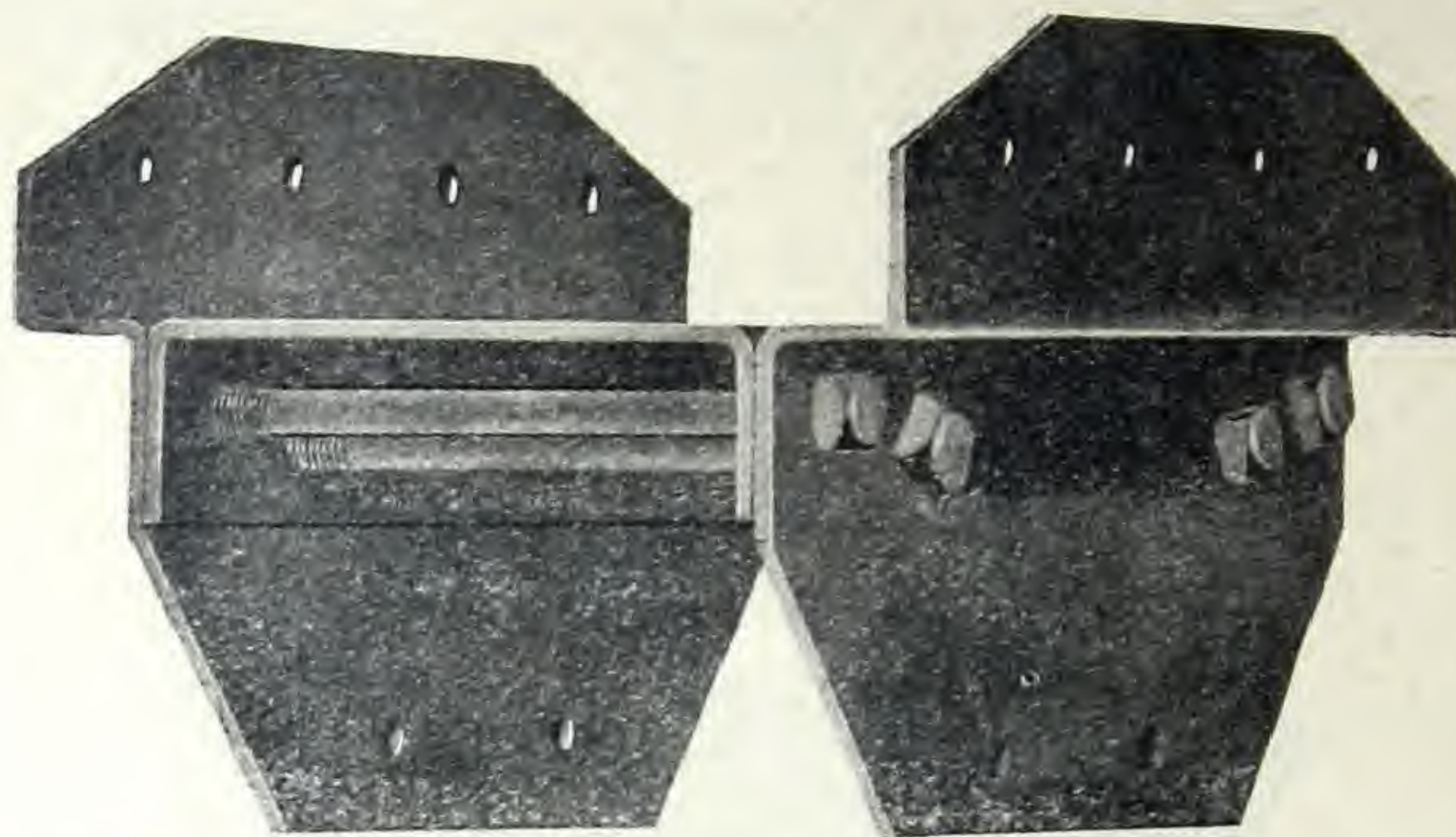
No. 331—Duplex Post Cap.

The cap is made in three pieces of mild steel. For post caps up to 12 in., $\frac{1}{4}$ inch steel is used, and for heavier construction $\frac{3}{8}$ in. or $\frac{1}{2}$ in. plates and bearing brackets are provided. The weight of the girder is carried on the shoulder formed on the post. The heavy bolts underneath the bearing brackets relieve the outer edge of the bracket and transmit the load directly



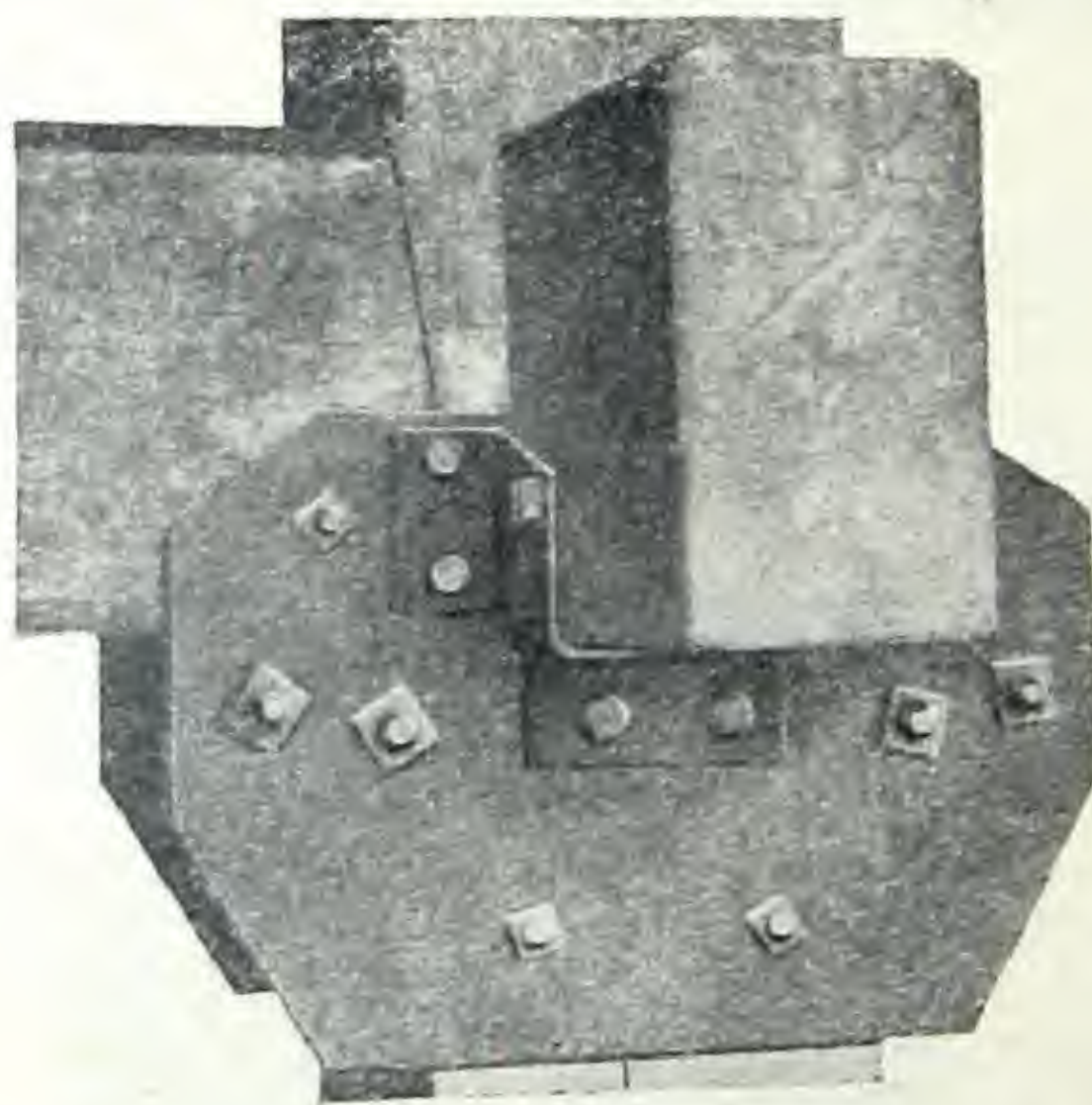
No. 332—Duplex, Bent-in side plates, 12x12 post below, 10x10 post above, carrying 10-girder.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Post Caps and Bases — *Continued*

No. 333—Duplex Bent-out side plates, 10x10 post carrying 14-inch girder.

to the post. The outer bolt is directly under the bearing bracket, while the inner bolt is close up against the post. The Duplex Post Caps are fastened to the posts by lag screws, forming a most rigid construction and virtually making a continuous post. The Duplex Post Cap can be used for a continuous post by cutting the bearing brackets in the center and notching the post to form a shoulder for the bearing bracket. These caps on account of their simple construction are readily made up to any desired detail and we illustrate a few of the stock sizes. All orders will be filled promptly.

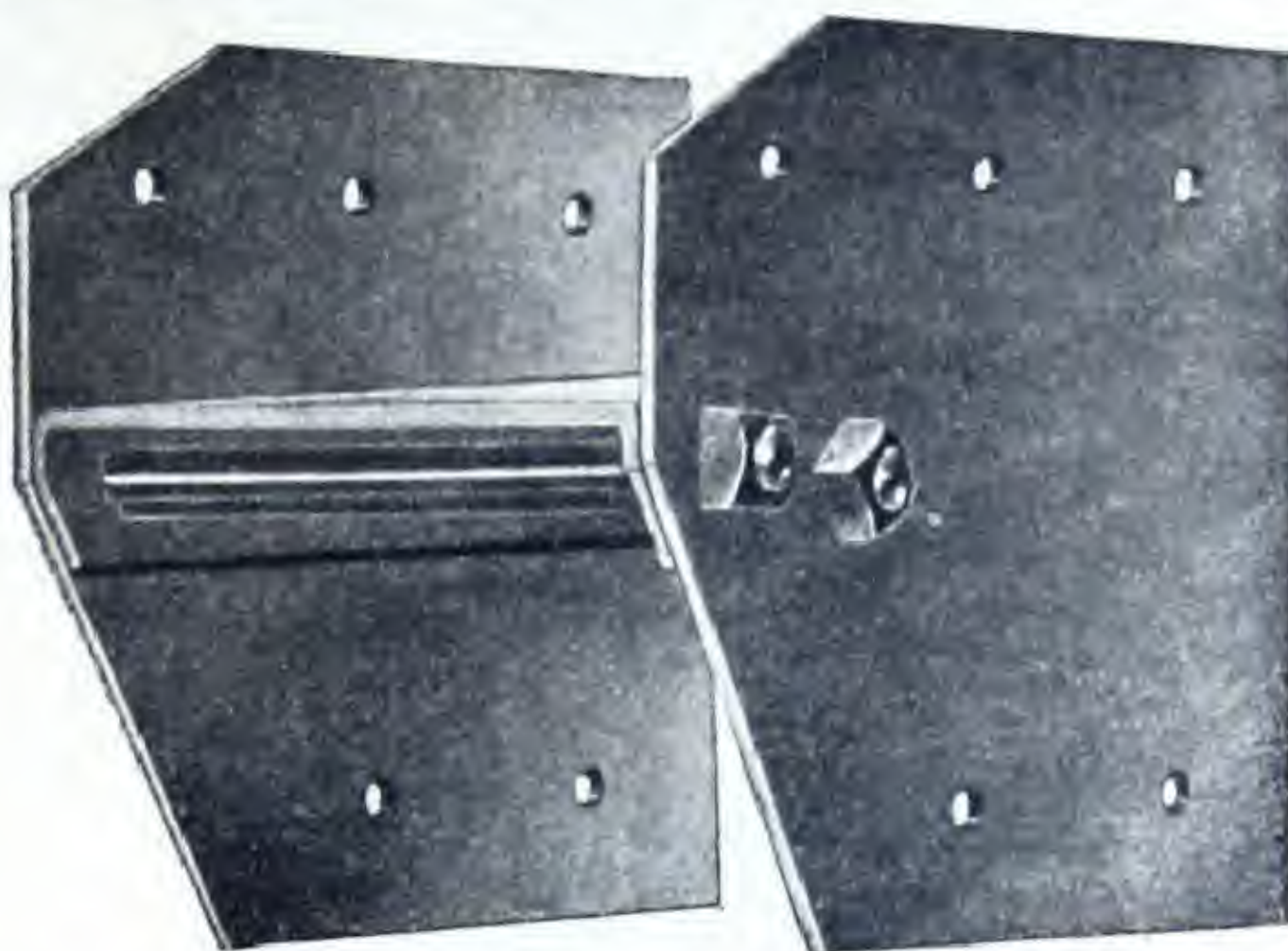


No. 334—Duplex Post Cap for 4-way construction 10x10 Post, carrying four 10-in. girders.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Post Caps and Bases—*Continued*

No. 335—Duplex 4-way Post Cap. 10x10 Post, 14-in. and 10-in. girders.



No. 336—Duplex One-way Post Cap. 12-in. post to carry one 12-in. girder.

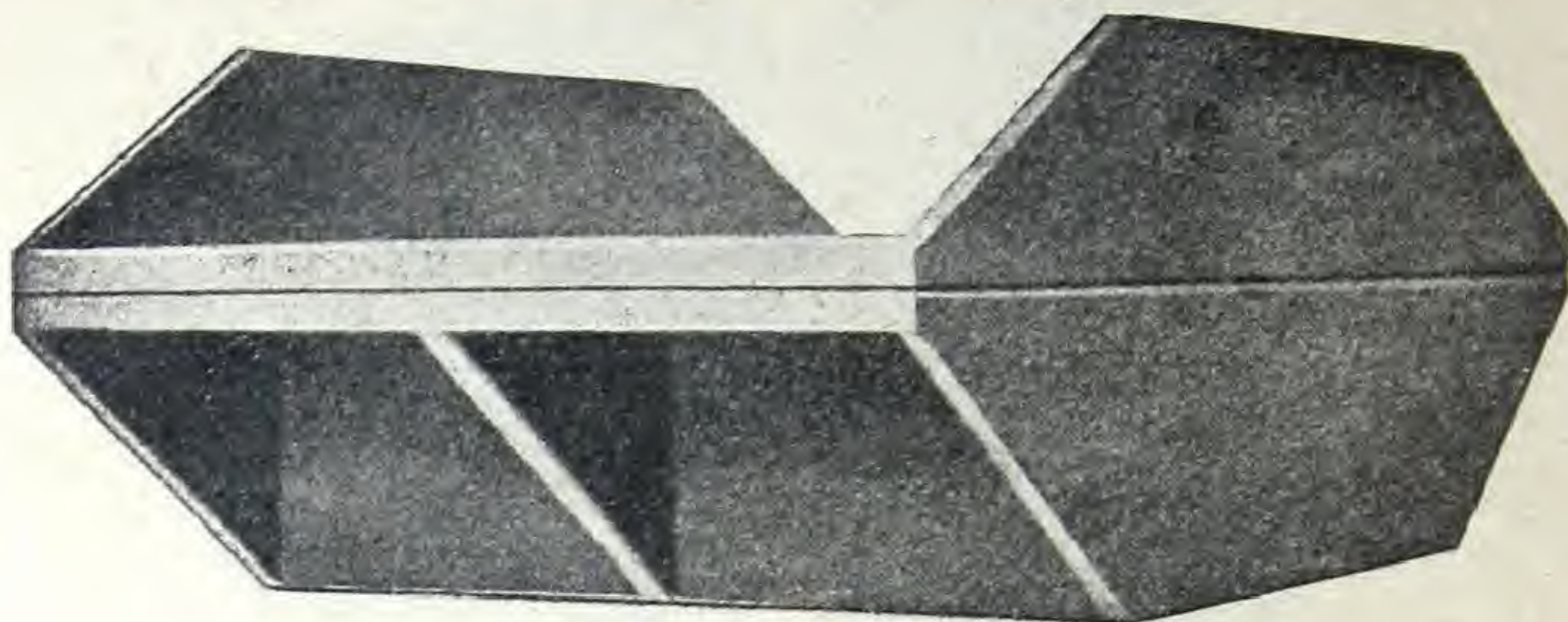
PRICE LIST DUPLEX POST CAPS (Including bolts)

6x 6	Post, two-way to carry	6-in. girder, shp. wgt.	30 lbs.	\$3.00
6x 6	" " " " "	8-in. " 1-in. offset, shp. wgt.	31 "	3.50
6x 6	" " " " "	10-in. " 2-in. " " "	34 "	4.00
8x 8	" " " " "	8-in. " shp. wgt.	35 "	4.00
8x 8	" " " " "	10-in. " 1-in. offset, shp. wgt.	36 "	4.50
8x 8	" " " " "	12-in. " 2-in. " " "	40 "	5.00
10x10	" " " " "	10-in. " shp. wgt.	52 "	5.00
10x10	" " " " "	12-in. " 1-in. offset, shp. wgt.	57 "	5.50
10x10	" " " " "	14-in. " 2-in. " " "	69 "	6.00
12x12	" " " " "	12-in. " shp. wgt.	72 "	6.00
12x12	" " " " "	14-in. " 1-in. offset, shp. wgt.	76 "	7.00
12x12	" " " " "	16-in. " 2 in. " " "	84 "	8.00
14x14	" " " " "	14-in. " shp. wgt.	124 "	8.00
14x14	" " " " "	16-in. " 1-in. offset, shp. wgt.	132 "	9.00
14x14	" " " " "	18-in. " 2-in. " " "	140 "	10.00
16x16	" " " " "	16-in. " shp. wgt.	155 "	10.00
16x16	" " " " "	18-in. " 1-in. offset, shp. wgt.	160 "	12.00
16x16	" " " " "	20-in. " 2-in. " " "	168 "	13.00
18x18	" " " " "	18-in. " shp. wgt.	160 "	16.00
20x20	" " " " "	20-in. " " " "	220 "	20.00

25 per cent. additional for three-way post caps. 50 per cent. additional for four-way post caps. Bent-in caps figured same as offset.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Post Caps and Bases — Continued



No. 337—Duplex Malleable Iron Post Cap No. 1 (patented).

The lower part of the post cap is made so as to form a complete cap for the post and when the upper channel is riveted on same, the ideal method of construction is had. By the use of lag-screws in the girders and posts a rigid connection is formed.

If the girders that are to be used are wider than the post on which they rest, then the upper channel will be furnished wide enough to fit the girder. Should the lower post be wider than the girders which it carries, a smaller channel can be furnished. This will insure a neat appearing and close fitting post cap. Special designs furnished if required.



No. 338—Duplex Malleable Iron Post Cap No. 2 (patented).

The post cap here shown is a malleable iron cap, the use of which makes it possible to carry girders on the post of greater or less width than the post itself. The girders should be tied together longitudinally by iron straps, spiked or fastened with lag-screws to their sides. The girders are anchored to the cap by lag-screws.

PRICE LIST OF DUPLEX MALLEABLE IRON CAPS No. 1

6x 6 post	\$ 3.00
8x 8 "	4.00
10x10 "	5.00
12x12 "	6.00
14x14 "	8.00
16x16 "	10.00
18x18 "	16.00

PRICE LIST OF DUPLEX MALLEABLE IRON CAPS No. 2

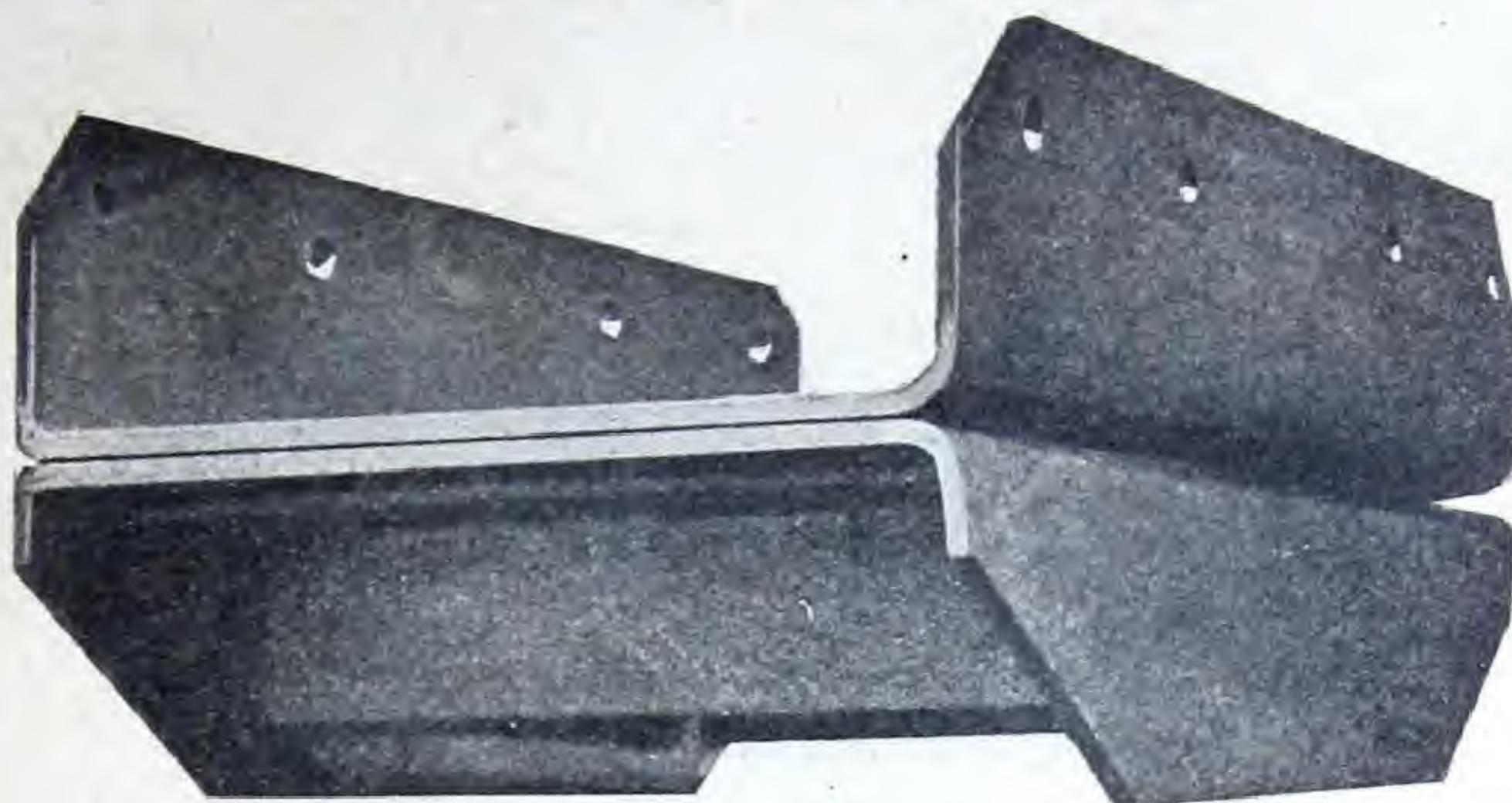
6x 6 post	\$ 2.00
8x 8 "	2.75
10x10 "	3.50
12x12 "	4.00
14x14 "	5.00
16x16 "	7.00
18x18 "	8.00

Write for discounts.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Post Caps and Bases — *Continued*

THE IDEAL STEEL POST CAPS



No. 339—The Ideal Steel Post Cap No. 1 (patented March 16, 1907).

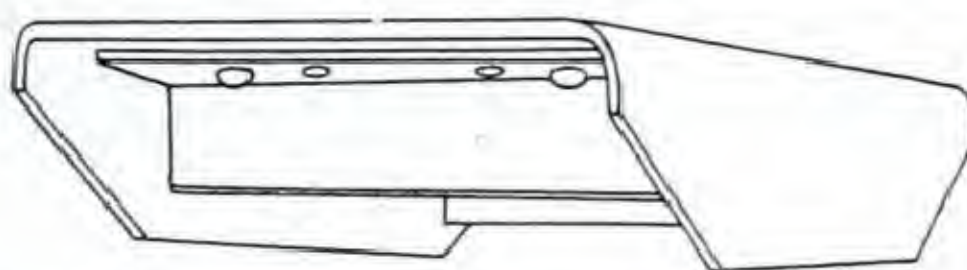
This post cap is made out of steel plates and angles of the required thickness to insure safe construction. The cap is made in two parts so as to make it adjustable to every possible size of post and girder. The upper part of the cap is built of a steel plate properly bent so as to provide an exact bearing for the girders. The construction of this post cap is such that both of the channels as well as the angles riveted thereto give a large factor of carrying capacity, and on account of its simplicity this cap is easily made for any possible construction. A large stock of all sizes is carried on hand and shipments can be made promptly.



No. 340—Ideal Post Cap No. 1 (patented)
10x10 post to carry 14-in. girder.



No. 341—Ideal Post Cap No. 1 (patented)
12x12 post to carry 10-in. girder.



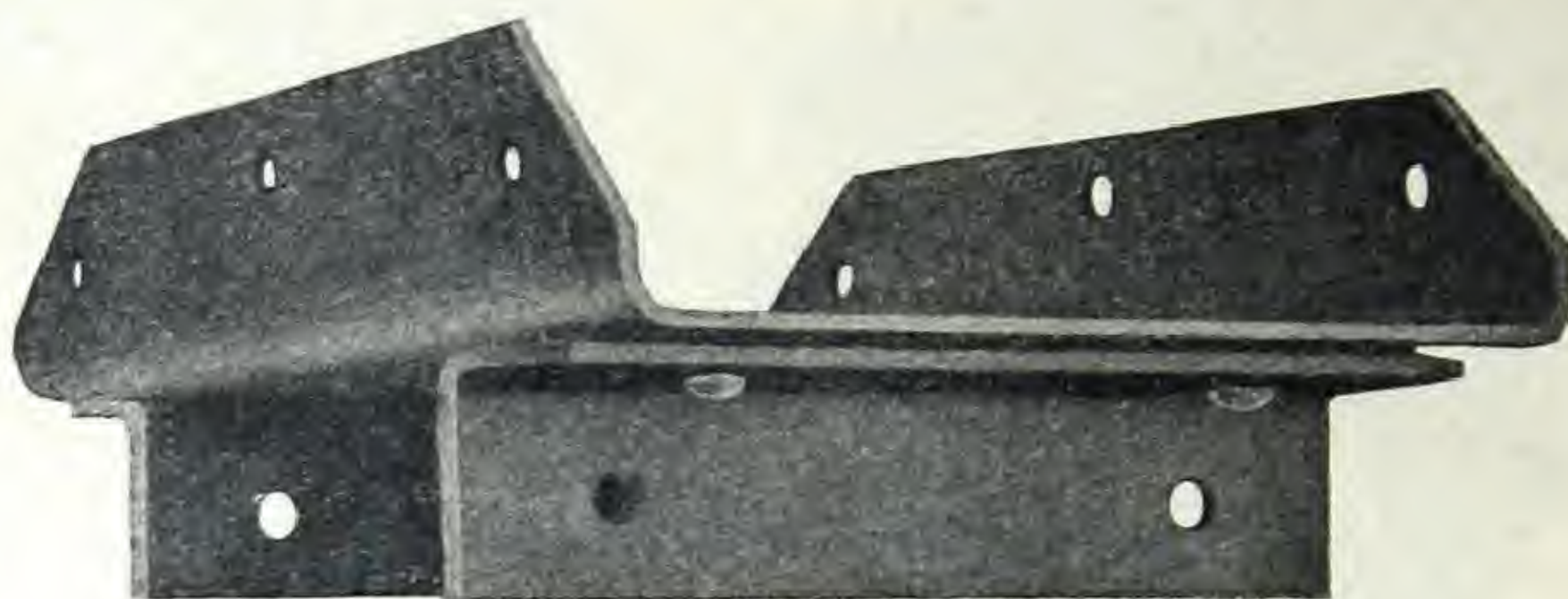
No. 342—Ideal Post Cap No. 2 (patented) any required size.

We are called upon very frequently to furnish a low priced steel post cap, and are prepared to furnish No. 2 Cap as illustrated by No. 342 of any required size. This cap will permit the use of either wider or narrower girders than the post carrying them. The girders should be securely tied together longitudinally by iron straps, spiked or fastened with lag-screws. The girders are anchored to the cap by lag-screws. Holes for $\frac{3}{8}$ -in. lag-screws are punched in the cap.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Post Caps and Bases — *Continued*

Ideal Post Caps No. 3 Patented. This cap forms a complete bearing channel for girders and with the support of the heavy angles, gives the necessary strength and lighter construction than No. 1. The angles form the cap of the post. Holes are punched for the tying of the girders and posts to the cap by means of lag-screws or bolts.



No. 343—Ideal Post Cap No. 3 (patented).

SIZES AND PRICES

IDEAL STEEL POST CAPS No. 1

6 x 6	post, to carry	6 in.	girder,		Price	\$ 3.00
6 x 6	"	8 in.	"	1 in. offset.	Price	3.50
6 x 6	"	10 in.	"	2 in. "	Price	4.00
8 x 8	"	8 in.	"		Price	4.00
8 x 8	"	10 in.	"	1 in. offset.	Price	4.50
8 x 8	"	12 in.	"	2 in. "	Price	5.00
10 x 10	"	10 in.	"		Price	5.00
10 x 10	"	12 in.	"	1 in. offset	Price	5.50
10 x 10	"	14 in.	"	2 in.	Price	6.00
12 x 12	"	12 in.	"		Price	6.00
12 x 12	"	14 in.	"	1 in. offset	Price	7.00
12 x 12	"	16 in.	"	2 in. "	Price	8.00
14 x 14	"	14 in.	"		Price	8.00
14 x 14	"	16 in.	"	1 in. offset	Price	9.00
14 x 14	"	18 in.	"	2 in. "	Price	10.00
16 x 16	"	16 in.	"		Price	10.00
18 x 18	"	18 in.	"		Price	16.00
20 x 20	"	20 in.	"		Price	20.00

IDEAL STEEL POST CAPS No. 2 AND No. 3

6 x 6	post	\$2.00
8 x 8	"	2.75
10 x 10	"	3.50
12 x 12	"	4.00
14 x 14	"	5.00
16 x 16	"	7.00
18 x 18	"	8.00

Write for discounts.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Post Caps and Bases — *Continued*

ATLAS POST CAPS (Patented)

MATERIAL—Structural Steel Angles.

SIZES—To suit any combination of posts and girders.

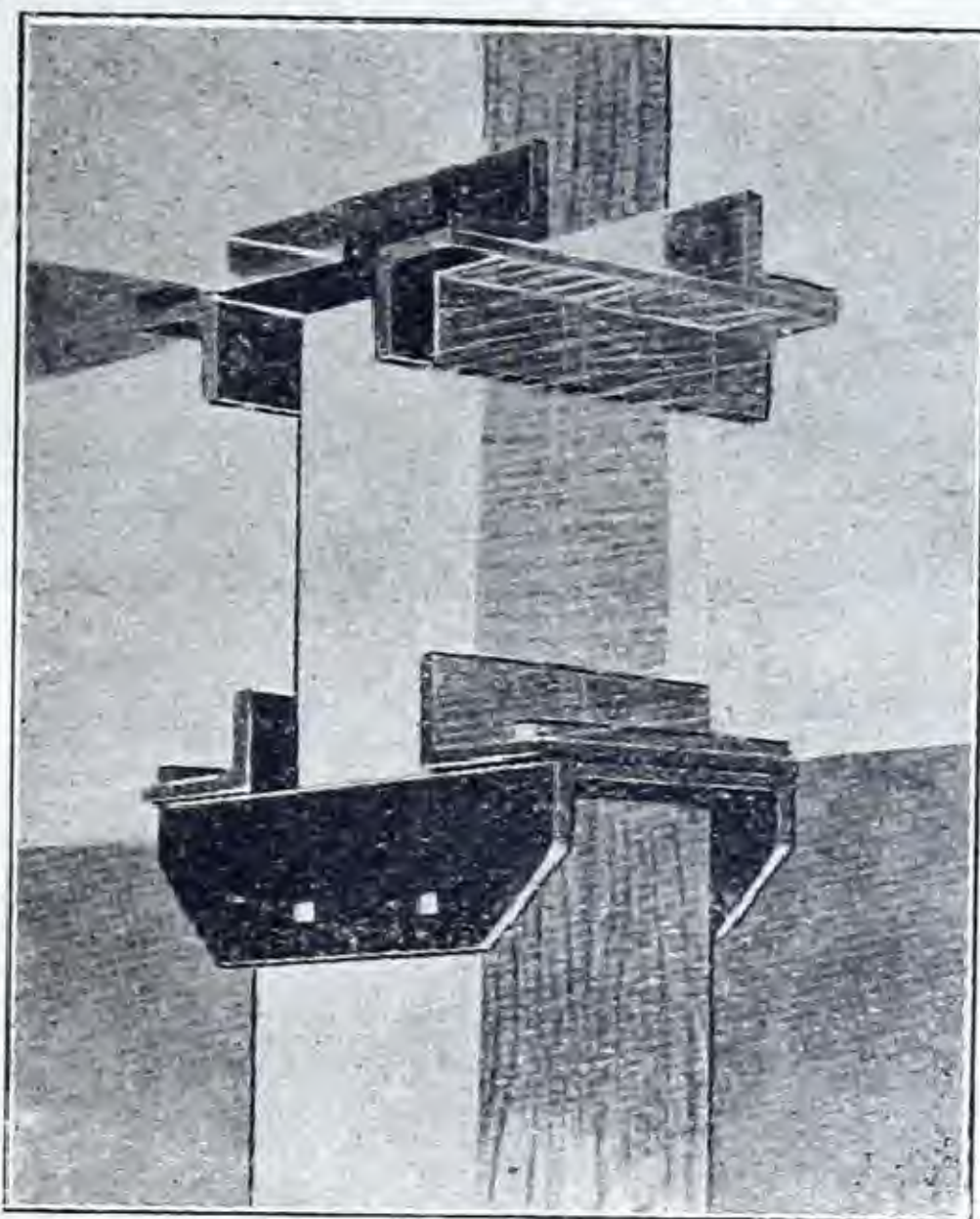
STYLES—2-way, 3-way and 4-way.

STRENGTH—Proportioned for any loading; girder seats are double thickness.

BEARING SEATS—Full width of timbers regardless of size of posts.

FIT ON POSTS—Fit both posts regardless of size of girders.

COST—Cheaper than cast caps of equal strength.



Post Collar.

2-way Post Cap.

No. 344

This cut shows a 14 in. x 14 in. lower post, 10 in. x 10 in. upper post. Atlas 2-way cap carrying two double girders made up of two 10 in. x 16 in. timbers, and the Atlas Post Collar carrying an 8 in. x 12 in. joist on a level with the joists resting on the top of girders.

ADVANTAGES

1st—The tight fit for both posts.

2nd—Full width bearing for girders.

3rd—No dressing down sides of girders or cutting into post.

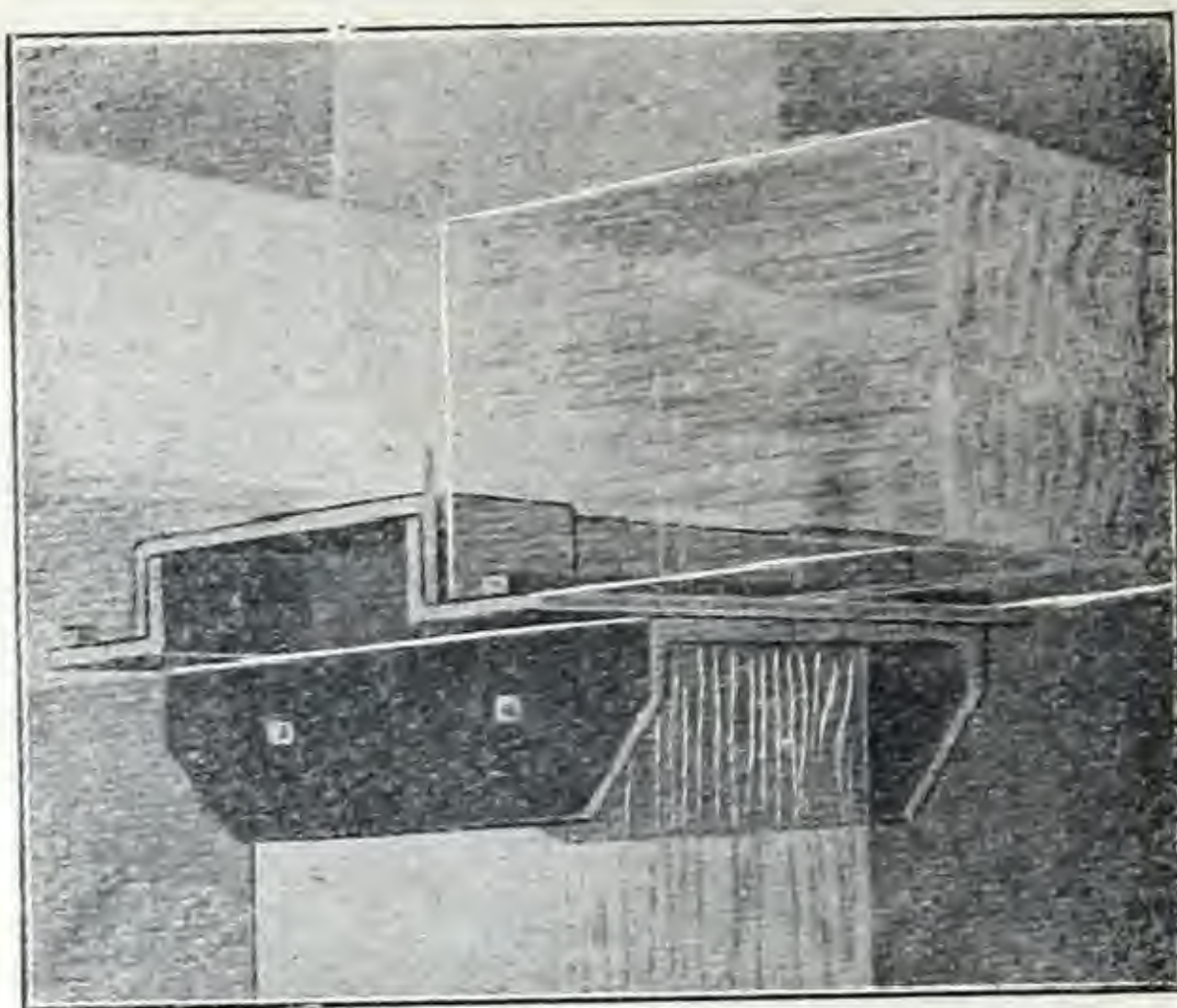
4th—No riveted joists carrying load.

5th—The Post Collar, its simplicity, its utility.

The Atlas Post Collar consists of four pieces of structural steel angle surrounding the post. Two of the angles rest upon the top of the girders and extend beyond the post to support the other two, which carry the floor joists abutting the posts on the same level as joists resting on top of girders. This post collar is simple and cheap. Made for any size post or joist. No rivets or riveted joists carrying load. Can be used with any make or style of post cap.

Made of structural steel angles; so assembled as to get the greatest possible strength from the component parts. The Atlas Post Caps have all the advantages of cast caps with none of the disadvantages. They not only fit both posts without reducing or cutting into the posts, but give a bearing for the full width of the widest girder, without dressing down the sides, because with this cap the width of the girder seats is independent of the size of either post. The result is a tight fit for ALL members and less load per square inch of girder surface resting on the cap, less crushing strain on the ends of the girder.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Post Caps and Bases — *Continued*

No. 345—3-way or 4-way Post Cap.

SIZES AND PRICES, ATLAS 2-WAY POST CAPS

Size of Post	Width of Girders	List Price
6 in. x 6 in.	Up to 8 in.	\$ 4.50
	Over 8 inch.	5.00
8 in. x 8 in.	Up to 10 inch.	5.30
	Over 10 inch.	6.00
10 in. x 10 in.	Up to 12 inch.	6.30
	Over 12-inch.	7.00
12 in. x 12 in.	Up to 14 inch.	7.30
	Over 14 inch.	8.50
14 in. x 14 in.	Up to 16 inch.	9.00
	Over 16 in.	10.00
16 in. x 16 in.	Up to 18 inch.	10.00
	Over 18 inch.	11.00
18 in. x 18 in.	Up to 20 inch.	11.00
	Over 20 in.	14.00
20 in. x 20 in.	Up to 20 inch.	16.00
	Over 20 inch.	19.00

For 3-way Post Caps add 25 per cent to above prices.

For 4-way Post Caps add 50 per cent. to above prices.

ATLAS POST COLLARS

6 in. x 6 in.	\$ 4.00
8 in. x 8 in.	4.50
10 in. x 10 in.	5.00
12 in. x 12 in.	5.50
14 in. x 14 in.	6.00
16 in. x 16 in.	6.75
18 in. x 18 in.	7.75
20 in. x 20 in.	9.00

Write for discounts stating size of posts and all girders framing to them.

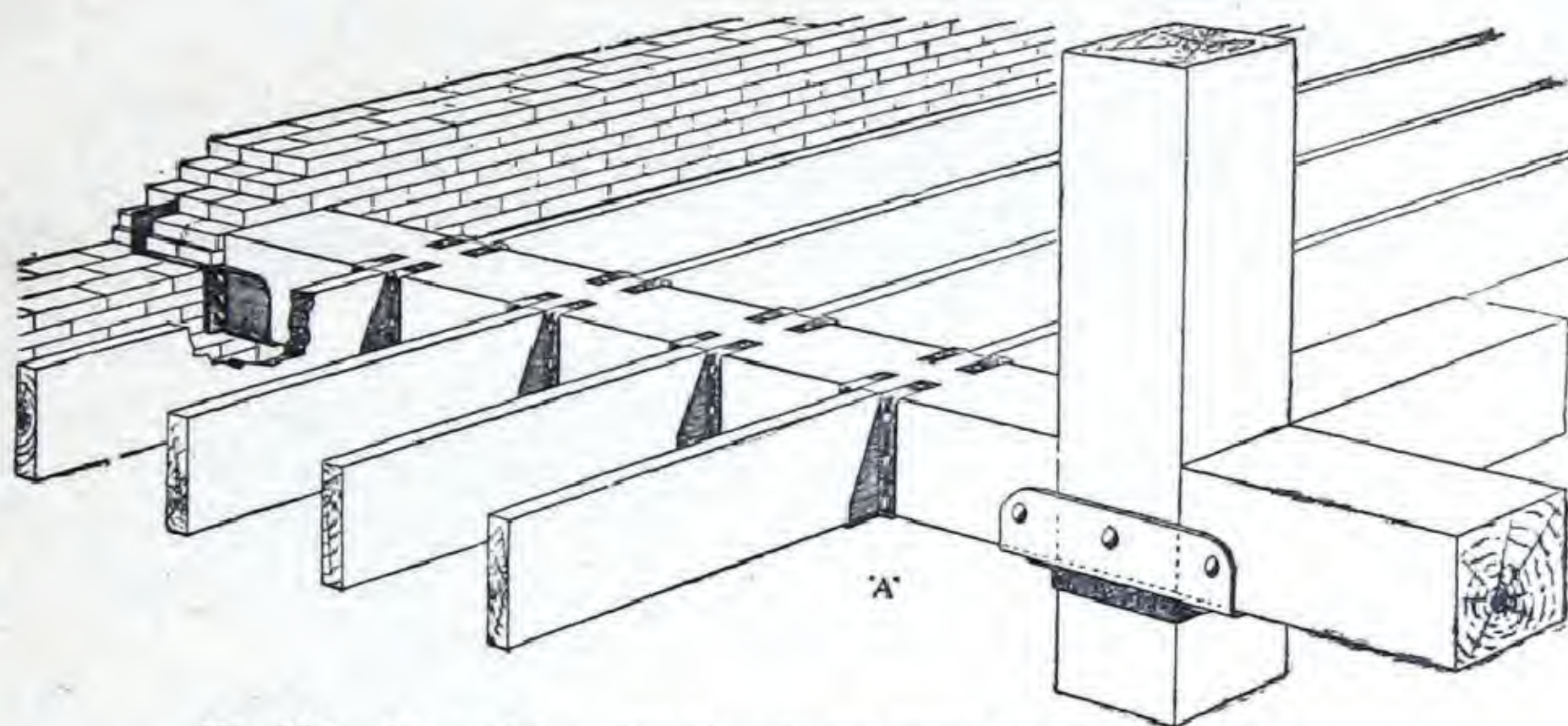
When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Post Caps and Bases — *Continued*

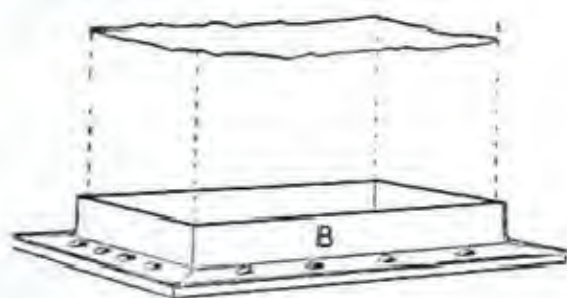
VAN DORN STEEL POST CAPS AND BASES

Attention is called to the cuts on this page showing entirely steel construction for heavy timber framing. The topmost cut shows Van Dorn regular Joist Hanger connected with extra heavy timber and wall header with a three-way post cap connection, all made of steel. No. 348 shows a single or two-way post cap in detail, and No. 347 the base plate. No. 349 shows a double or four-way post cap.

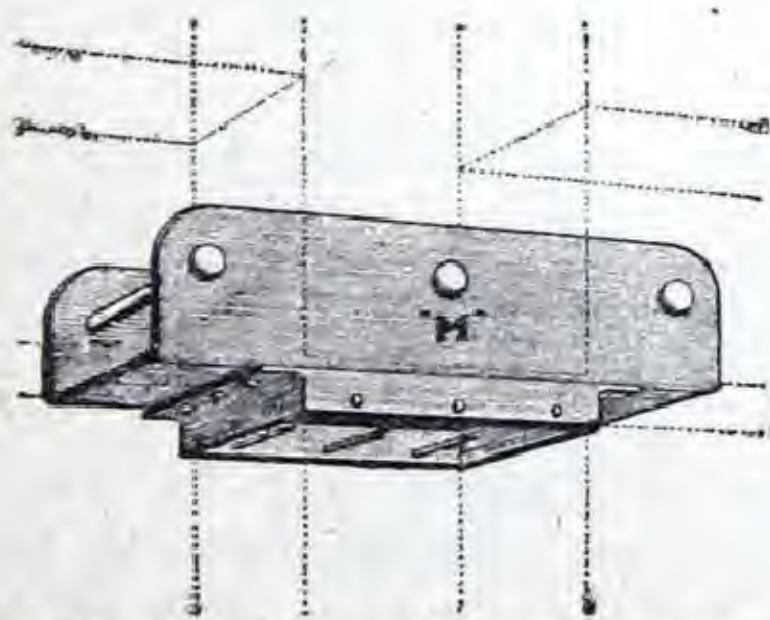
In ordering Post Caps state whether two, three or four-way are wanted. Give sizes of bottom and top posts and width of girders resting on caps. In ordering Post Bases, state sizes of posts.



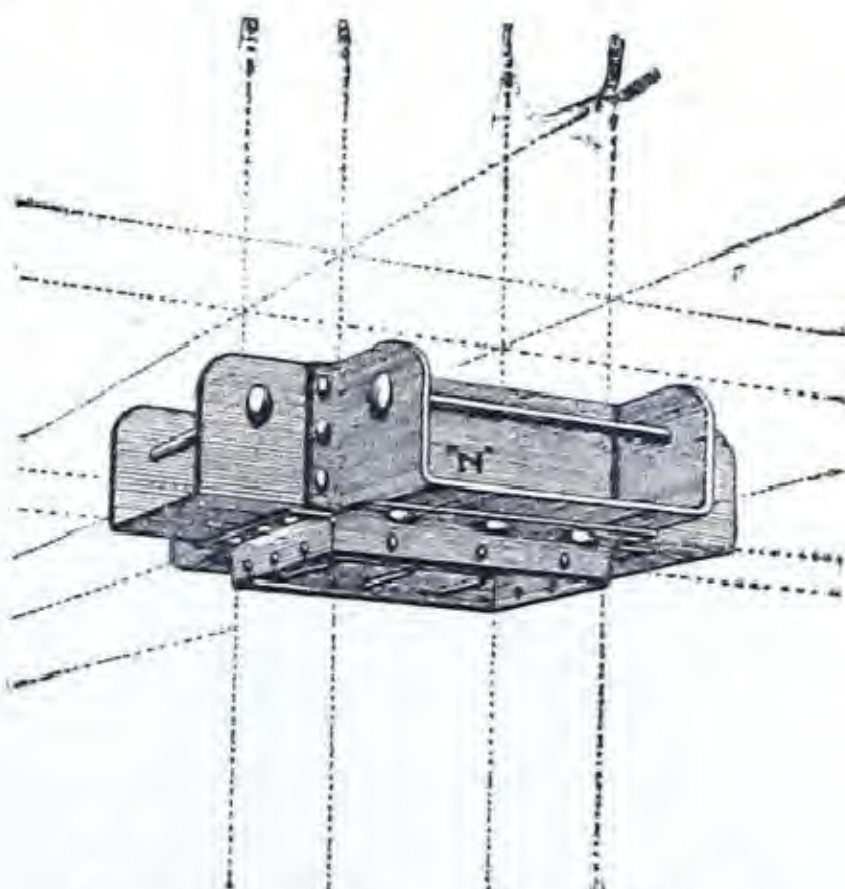
No. 346—Plan of framing showing regular Hangers, Wall Hangers and "A" 3-way Post Cap.



No. 347 — Post Base "B."



No. 348—2-way Post Cap "M."



No. 349—4-way Post Cap "N."

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Post Caps and Bases — *Continued*

PRICE LIST OF REGULAR SIZES OF VAN DORN STEEL POST CAPS AND BASES

Two-way Post Cap "M" No. 348

Size	Weight	Price
6x 6 inch Posts and 6 inch wide girders	35 lbs.	\$3.85
8x 8 " " " 8 " " " "	43 "	4.15
10x10 " " " 10 " " " "	60 "	4.85
12x12 " " " 12 " " " "	72 "	5.35
14x14 " " " 14 " " " "	85 "	6.00
16x16 " " " 16 " " " "	100 "	6.75
18x18 " " " 18 " " " "	115 "	8.00

Three-way Post Cap "A" No. 346

6x 6 inch Posts and 6 inch wide girders	48 lbs.	\$4.65
8x 8 " " " 8 " " " "	60 "	5.00
10x10 " " " 10 " " " "	78 "	5.85
12x12 " " " 12 " " " "	95 "	6.50
14x14 " " " 14 " " " "	110 "	7.25
16x16 " " " 16 " " " "	125 "	8.25
18x18 " " " 18 " " " "	140 "	9.75

Four-way Post Cap "N" No. 349

6x 6 inch Posts and 6 inch wide girders	61 lbs.	\$5.35
8x 8 " " " 8 " " " "	77 "	5.75
10x10 " " " 10 " " " "	96 "	6.80
12x12 " " " 12 " " " "	118 "	7.50
14x14 " " " 14 " " " "	135 "	8.50
16x16 " " " 16 " " " "	150 "	9.65
18x18 " " " 18 " " " "	165 "	11.50

Post Bases "B" No. 347

6x 6 inch Posts	17 lbs.	\$2.30
8x 8 " " "	26 "	2.50
10x10 " " "	34 "	2.80
12x12 " " "	42 "	3.30
14x14 " " "	50 "	3.90
16x16 " " "	60 "	4.40
18x18 " " "	70 "	5.15

CAN MAKE SPECIAL CAPS AND BASES ANY SIZE TO ORDER

Caps are special when girders are different widths than posts, or vice versa, and in figuring them the largest width measurement, whether it be of posts or girder, will govern the price.

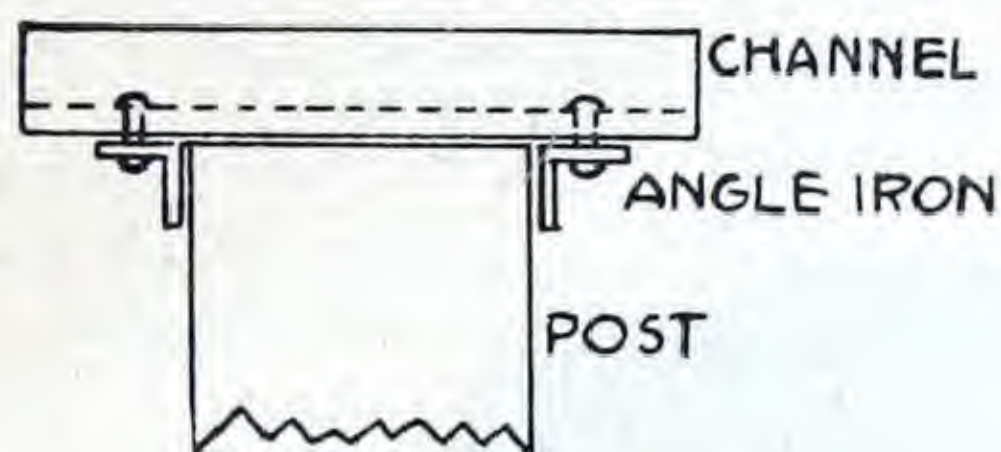
One-way caps are special, and should be figured same as two-way or "M" caps; a corner cap is a special two-way cap and should be estimated same as a three-way or "A" cap.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

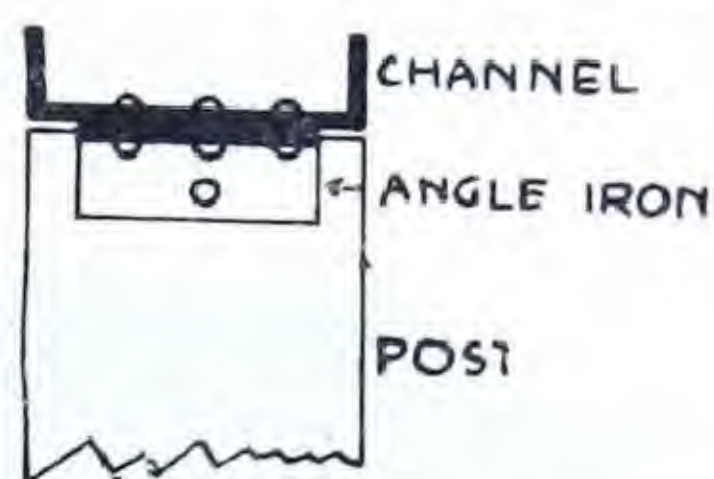
Post Caps and Bases — *Continued*

(MISCELLANEOUS)

Very serviceable and low priced Post Caps can be made up of standard channel, I-beam and angle sections as illustrated by Nos. 350 and 352, page 191. The different parts are riveted together as shown. Hundreds of them are sold for building construction in all parts of Western Canada. The angles form the post cap and the channel or I-Beam carries the girder. Post Caps of this description can be made of any size up to the limit of size

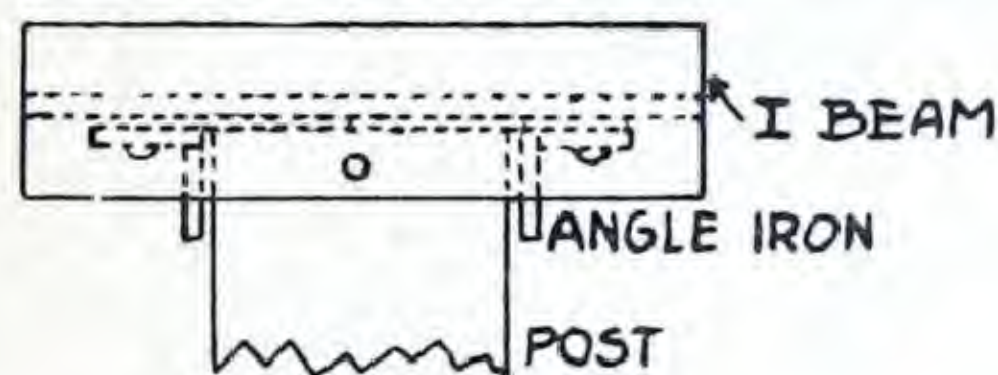


No. 350—Steel Post Cap. Channel and Angles, riveted—side view.

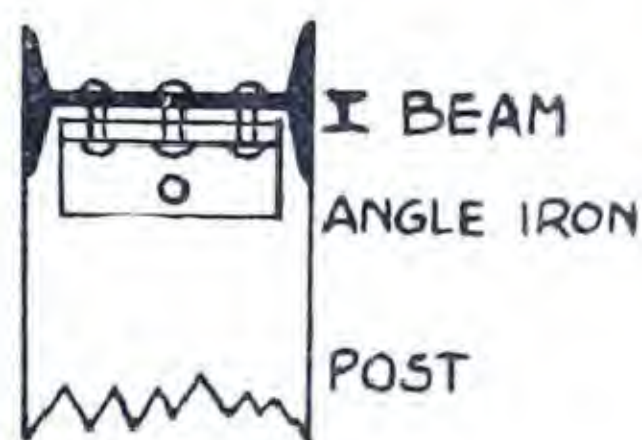


No. 351—Steel Post Cap, Channel and Angles, riveted—end view.

of standard rolled sections of I-beams and channels. The angles are spiked to the post and the channel or I-beam is spiked to the girders. The girders should be securely fastened together lengthwise with iron straps or dogs. As we always carry a large stock of assorted sizes of I-beams, channels and angles, steel post caps of this kind can be made up very readily of any



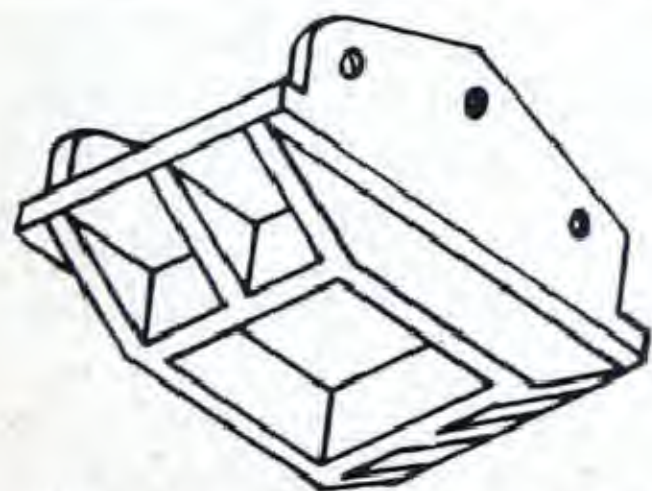
No. 352—Steel Post Cap, I-Beam and Angles, riveted—side view.



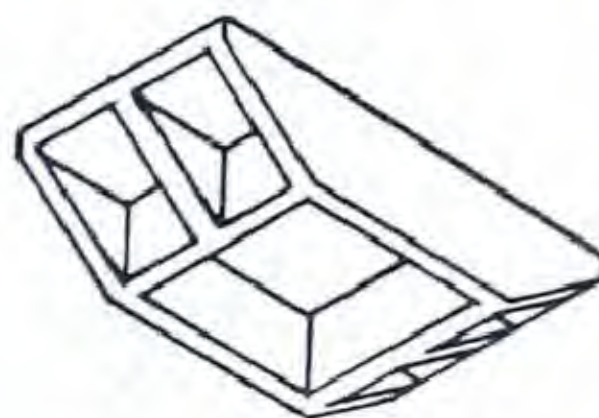
No. 353—Same as No. 334—end view.

required size and shipped promptly. They are sold either at so much per 100 lbs. or at a stated price for any number required. Size of post and of girders should be given when writing for prices.

Cast Iron Post Caps are made up in a great variety of designs, two styles of which are shown by Nos. 354 and 355, page 191. In No. 354 the Post



No. 354—Cast iron 2-way Post Cap to carry girders wider than post.



No. 355—Cast iron Post Cap to carry girders either wider or narrower than post.

When ordering or writing for prices, read carefully "Instructions to Buyers" on page 216

Post Caps and Bases — *Continued*

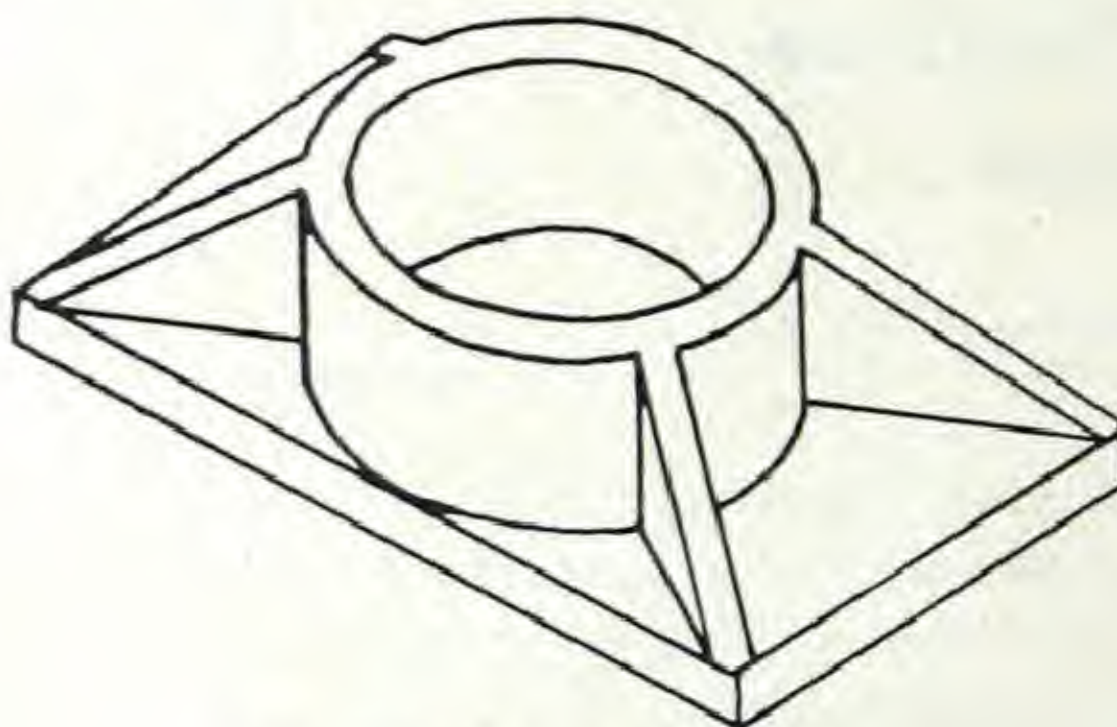
Cap is spiked to the girders through the sides of cap. In No. 355 the girder should be fastened together lengthwise with iron straps or dogs. Cast Iron Post Caps of any required size can be made up promptly in our Foundry, and will be sold at a base price of \$3.50 per 100 lbs., F.O.B. Winnipeg. When ordering state clearly size of post and girders to be carried. Special designs will be furnished at any time and lump sum price quoted on orders for any number.

POST BASES



No. 356—Steel Post Base.

For timber posts, both steel and cast iron bases are used. No. 356 shows a steel post base made up of a plate and angles all riveted together and properly finished off. These bases can be made up for any size of post and will be shipped promptly. Prices on application.



No. 357—Cast iron Post Base.

Cast Iron Post Bases are often called for. No. 357 shows one type, for round wooden column or post. Any style or any size can be made up on short notice in our Foundry, and prompt shipment made. We have on hand a large number of patterns for these post bases from which castings can be made. Prices on application. Send sizes of posts when ordering and state whether round or square.

Manufacturers' Standard Specifications

REVISED TO FEBRUARY 6, 1903

STRUCTURAL STEEL

PROCESS OF MANUFACTURE

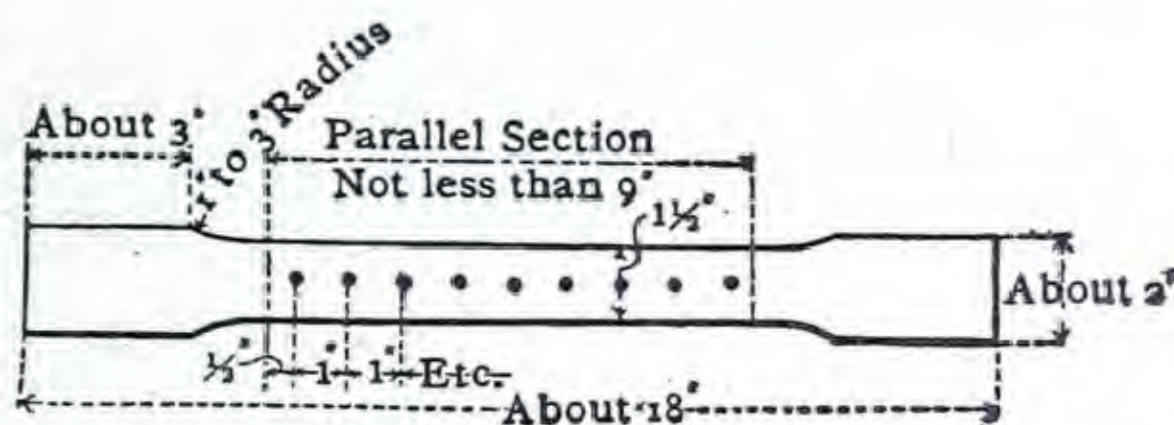
1. Steel may be made by either the Open-hearth or Bessemer process.

TESTING AND INSPECTION

2. All tests and inspections shall be made at the place of manufacture prior to shipment.

TEST PIECES

3. The tensile strength, limit of elasticity and ductility, shall be determined from a standard test piece cut from the finished material. The standard shape of the test piece for sheared plates shall be as shown by the following sketch:



Piece to be the same thickness as the plate.

On tests cut from other material the test piece may be either the same as for sheared plates, or it may be planed or turned parallel throughout its entire length, and in all cases where possible, two opposite sides of the test piece shall be the rolled surfaces. The elongation shall be measured on an original length of 8 inches, except as modified in section 12, paragraph c. Rivet rounds and small bars shall be tested of full size as rolled.

Two test pieces shall be taken from each melt or blow of finished material, one for tension and one for bending; but in case either test develops flaws, or the tensile test piece breaks outside of the middle third of its gauged length, it may be discarded and another test piece substituted therefor.

ANNEALED TEST PIECES

4. Material which is to be used without annealing or further treatment shall be tested in the condition in which it comes from the rolls. When material is to be annealed or otherwise treated before use, the specimen representing such material shall be similarly treated before testing.

MARKING

5. Every finished piece of steel shall be stamped with the blow or melt number, and steel for pins shall have the blow or melt number stamped on the ends. Rivet and lacing steel, and small pieces for pin plates and stiffeners, may be shipped in bundles securely wired together, with the blow or melt number on a metal tag attached.

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Manufacturers' Standard Specifications—*Continued*

FINISH

6. Finished bars shall be free from injurious seams, flaws or cracks, and have a workmanlike finish.

CHEMICAL PROPERTIES

7A.	Steel for Buildings, Train sheds, Highway Bridges and similar structures.	}	Maximum Phosphorus .10 per cent.
7B.	Steel for Railway Bridges.		

PHYSICAL PROPERTIES

8. Structural Steel shall be of three grades, RIVET, RAILWAY BRIDGE AND MEDIUM.

RIVET STEEL

9. Ultimate strength, 48,000 to 58,000 pounds per square inch.
Elastic limit, not less than one-half the ultimate strength.

Percentage of elongation, $\frac{1,400,000}{\text{Ultimate strength}}$.

Bending test, 180 degrees flat on itself, without fracture on outside of bent portion.

STEEL FOR RAILWAY BRIDGES

10. Ultimate strength, 55,000 to 65,000 pounds per square inch.
Elastic limit, not less than one-half the ultimate strength.

Percentage of elongation, $\frac{1,400,000}{\text{Ultimate strength}}$.

Bending test, 180 degrees to a diameter equal to thickness of piece tested, without fracture on outside of bent portion.

MEDIUM STEEL

11. Ultimate strength, 60,000 to 70,000 pounds per square inch.
Elastic limit, not less than one-half the ultimate strength.

Percentage of elongation, $\frac{1,400,000}{\text{Ultimate strength}}$.

Bending test, 180 degrees to a diameter equal to thickness of piece tested, without fracture on outside of bent portion.

Manufacturers' Standard Specifications—*Continued*

MODIFICATIONS IN ELONGATION FOR THIN AND THICK MATERIAL

12. For material less than $\frac{5}{16}$ inch, and more than $\frac{3}{4}$ inch in thickness, the following modifications shall be made in the requirements for elongation:

A. For each increase of $\frac{1}{8}$ inch in thickness above $\frac{3}{4}$ inch, a deduction of 1 per cent. shall be made from the specified elongation, except that the minimum elongation shall be 20 per cent. for eye-bar material and 18 per cent. for other structural material.

B. For each decrease of $\frac{1}{16}$ inch in thickness below $\frac{5}{16}$ inch, a deduction of $2\frac{1}{2}$ per cent. shall be made from the specified elongation.

C. In rounds of $\frac{5}{8}$ inch or less in diameter, the elongation shall be measured in a length equal to eight times the diameter of section tested.

D. For pins made from any of the before-mentioned grades of steel, the required elongation shall be 5 per cent. less than that specified for each grade, as determined on a test piece, the centre of which shall be one inch from the surface to the bar.

VARIATION IN WEIGHT

13. The variation in cross-section or weight of more than $2\frac{1}{2}$ per cent. from that specified will be sufficient cause for rejection, except in the case of sheared plates which will be covered by the following permissible variations:

A. Plates $12\frac{1}{2}$ pounds per square foot or heavier, up to 100 inches wide, when ordered to weight, shall not average more than $2\frac{1}{2}$ per cent. variation above or $2\frac{1}{2}$ per cent. below the theoretical weight. When 100 inches wide and over, 5 per cent. above or 5 per cent. below the theoretical weight.

B. Plates under $12\frac{1}{2}$ pounds per square foot when ordered to weight, shall not average a greater variation than the following:

Up to 75 inches wide, $2\frac{1}{2}$ per cent. above or $2\frac{1}{2}$ per cent. below the theoretical weight. 75 inches wide up to 100 inches wide, 5 per cent. above or 3 per cent. below the theoretical weight. When 100 inches wide and over, 10 per cent. above or 3 per cent. below the theoretical weight.

PLATES WILL BE CONSIDERED UP TO GAUGE IF MEASURING NOT OVER $\frac{1}{100}$ INCH LESS THAN THE ORDERED GAUGE. THE WEIGHT OF 1 CUBIC INCH OF ROLLED STEEL IS ASSUMED TO BE 0.2833 POUND

STRUCTURAL CAST IRON

1. Except when chilled iron is specified, all castings shall be tough gray iron, free from injurious cold-shuts or blow-holes, true to pattern, and of a workmanlike finish. Sample pieces, one inch square, cast from the same heat of metal in sand moulds, shall be capable of sustaining on a clear span of 4 feet 8 inches, a central load of 500 pounds when tested in the rough bar.

FREIGHT RATES IN CENTS PER 100 LBS. FROM WINNIPEG

Name of Station	1st Class	2nd Class	3rd Class	4th Class	5th Class	6th Class
Arcola	\$0.75	\$0.63	\$0.51	\$0.39	\$0.34	\$0.26
Abernethy	.89	.75	.60	.46	.40	.32
Alameda	.75	.63	.51	.39	.34	.26
Altona	.30	.26	.21	.17	.15	.10
Asquith	1.22	1.02	.83	.63	.56	.45
Baldur	.44	.37	.30	.24	.21	.17
Balgonie	.91	.77	.62	.47	.41	.33
Bank Head	1.83	1.53	1.23	.93	.83	.70
Banff	1.88	1.57	1.26	.96	.86	.72
Battleford	1.30	1.09	.88	.67	.60	.48
Beausejour	.24	.21	.17	.14	.12	.08
Birtle	.57	.48	.39	.30	.27	.21
Blairmore	1.65	1.38	1.11	.84	.75	.62
Boissevain	.57	.48	.39	.30	.27	.21
Brandon	.48	.41	.33	.26	.23	.18
Broadview	.77	.65	.52	.40	.35	.27
Calgary	1.61	1.35	1.08	.82	.73	.60
Camrose	1.83	1.53	1.23	.93	.83	.70
Canmore	1.70	1.43	1.14	.86	.76	.64
Canora	.83	.70	.57	.43	.38	.30
Carberry	.42	.36	.29	.23	.20	.16
Cardston	1.83	1.54	1.24	.94	.85	.70
Carnduff	.69	.58	.47	.36	.32	.24
Carlyle	.72	.61	.49	.38	.33	.25
Carman	.27	.23	.19	.15	.13	.09
Claresholm	1.61	1.35	1.08	.82	.73	.60
Cochrane	1.65	1.38	1.11	.84	.75	.62
Coleman	1.65	1.38	1.11	.84	.75	.62
Dauphin	.56	.47	.38	.29	.26	.20
Davidson	1.08	.91	.73	.56	.49	.39
Daysland	1.88	1.57	1.26	.96	.86	.72
Deloraine	.60	.51	.41	.32	.28	.21
Didsbury	1.70	1.43	1.14	.86	.76	.64
Duck Lake	1.22	1.02	.83	.63	.56	.45
Dundurn	1.14	.96	.77	.59	.52	.42
Edmonton	1.61	1.35	1.08	.82	.73	.60
Elkhorn	.57	.48	.39	.30	.27	.21
Emerson	.32	.27	.23	.18	.16	.11
Esterhazy	.77	.65	.52	.40	.35	.27
Estevan	.83	.70	.57	.43	.38	.30
Fort Frances	.60	.51	.41	.32	.28	.21
Ft. Saskatchewan	1.61	1.35	1.08	.82	.73	.60
Fort William	.89	.75	.60	.45	.40	.34
Frank	1.65	1.38	1.11	.84	.75	.62
Gainsboro	.63	.53	.43	.33	.29	.22
Gimli	.30	.26	.21	.17	.15	.10
Gladstone	.38	.32	.27	.21	.19	.14
Gleichen	1.56	1.31	1.05	.79	.70	.58
Glenboro	.42	.36	.29	.23	.20	.16
Govan	1.03	.86	.69	.53	.47	.37
Grand View	.60	.51	.41	.32	.28	.21
Gilbert Plains	.57	.48	.39	.30	.27	.21
Grenfell	.81	.68	.55	.42	.37	.29
Gretna	.34	.29	.24	.19	.17	.12
Hamiota	.54	.46	.37	.29	.26	.20
Hanley	1.12	.94	.76	.58	.51	.41
Hartney	.54	.46	.37	.29	.26	.20
High River	1.65	1.38	1.11	.84	.75	.62
Holland	.38	.32	.27	.21	.19	.14
Humbolt	1.03	.86	.69	.53	.47	.37
Indian Head	.86	.72	.57	.43	.38	.30
Innisfail	1.70	1.43	1.14	.86	.76	.64
Irvine	1.36	1.14	.92	.70	.62	.51
Kamsack	.81	.68	.55	.42	.37	.29
Keewatin	.46	.39	.32	.25	.22	.18
Kenora	.46	.39	.32	.25	.22	.18
Killarney	.54	.46	.37	.29	.26	.20
Lacombe	1.79	1.50	1.20	.91	.81	.68
Langham	1.18	.99	.79	.61	.54	.43
Lanigan	1.08	.91	.73	.56	.49	.39
Leduc	1.83	1.53	1.23	.93	.83	.70
Lemberg	.86	.72	.58	.44	.39	.31

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

FREIGHT RATES IN CENTS PER 100 LBS. FROM WINNIPEG

Name of Station	1st Class	2nd Class	3rd Class	4th Class	5th Class	6th Class
Lethbridge	1.51	1.27	1.02	.77	.69	.57
Lloydminster	1.40	1.17	.94	.72	.64	.52
Lumsden	.95	.80	.64	.49	.43	.34
Macleod	1.56	1.31	1.05	.79	.70	.58
Macoun	.86	.72	.58	.44	.39	.31
Magrath	1.70	1.44	1.15	.87	.78	.65
Manitou	.42	.36	.29	.23	.20	.16
Maple Creek	1.28	1.07	.86	.66	.59	.48
Macgregor	.36	.31	.25	.20	.18	.13
Medicine Hat	1.40	1.17	.94	.72	.64	.52
Melita	.57	.48	.39	.30	.27	.21
Melfort	1.12	.94	.76	.58	.51	.41
Melville	.86	.72	.58	.44	.39	.31
Milestone	.97	.81	.66	.50	.44	.35
Minnedosa	.48	.41	.33	.26	.23	.18
Moose Jaw	.99	.83	.67	.51	.45	.36
Moosomin	.66	.56	.45	.34	.30	.23
Morden	.36	.31	.25	.20	.18	.13
Morris	.24	.21	.17	.14	.12	.08
Nanton	1.61	1.35	1.08	.82	.73	.60
Napinka	.57	.48	.39	.30	.27	.21
Neepawa	.44	.37	.30	.24	.21	.17
North Battleford	1.26	1.06	.85	.65	.58	.47
Nokomis	1.05	.88	.71	.54	.48	.38
Oak Lake	.54	.46	.37	.29	.26	.20
Okotoks	1.65	1.38	1.11	.84	.75	.62
Olds	1.70	1.43	1.14	.86	.76	.64
Pilot Mound	.46	.39	.32	.25	.22	.18
Pincher Creek	1.61	1.35	1.08	.82	.73	.60
Plum Coulee	.32	.27	.23	.18	.16	.11
Ponoka	1.79	1.50	1.20	.91	.81	.68
Portage la Prairie	.30	.26	.21	.17	.15	.10
Port Arthur	.89	.75	.60	.45	.40	.34
Prince Albert	1.22	1.02	.83	.63	.56	.45
QuAppelle	.86	.72	.58	.44	.39	.31
Radisson	1.22	1.02	.83	.63	.56	.45
Rapid City	.50	.42	.34	.27	.24	.19
Rainy River	.52	.44	.36	.28	.25	.19
Raymond	1.65	1.39	1.11	.84	.75	.63
Red Deer	1.75	1.46	1.18	.89	.79	.66
Regina	.93	.78	.63	.48	.42	.33
Roland	.32	.27	.23	.18	.16	.11
Rosthern	1.18	.99	.79	.61	.54	.43
Roleau	.99	.83	.67	.51	.45	.36
Russell	.63	.53	.43	.33	.29	.22
Saltcoats	.75	.63	.51	.39	.34	.26
Saskatoon	1.14	.96	.77	.59	.52	.42
Selkirk	.18	.16	.13	.11	.09	.06
Shoal Lake	.56	.47	.38	.29	.26	.20
Sintaluta	.83	.70	.57	.43	.38	.30
Stettler	1.83	1.53	1.23	.93	.83	.70
Souris	.52	.44	.36	.28	.25	.19
St. Albert	1.65	1.38	1.11	.84	.75	.62
Stirling	1.51	1.27	1.02	.77	.69	.57
Stonewall	.18	.16	.13	.11	.09	.06
Taber	1.51	1.27	1.02	.77	.69	.57
Treherne	.34	.29	.24	.19	.17	.12
Vegreville	1.56	1.31	1.05	.79	.70	.58
Vermilion	1.44	1.21	.97	.74	.66	.54
Virden	.57	.48	.39	.30	.27	.21
Vonda	1.10	.92	.74	.57	.50	.40
Wadena	.95	.80	.64	.49	.43	.34
Wainwright	1.44	1.21	.97	.74	.66	.54
Watrous	1.10	.92	.74	.57	.50	.41
Wapella	.72	.61	.49	.38	.33	.25
Wawanesa	.46	.39	.32	.25	.22	.18
Weyburn	.91	.77	.62	.47	.41	.33
Wetaskiwin	1.79	1.50	1.20	.91	.81	.68
Whitewood	.75	.63	.51	.39	.34	.26
Wilkie	1.30	1.09	.88	.67	.60	.48
Winkler	.34	.29	.24	.19	.17	.12
Winnipegosis	.63	.53	.43	.33	.29	.22
Wolseley	.83	.70	.57	.43	.38	.30
Yellow Grass	.93	.78	.63	.48	.42	.33
Yorkton	.79	.67	.54	.41	.36	.28

When ordering or asking for prices, read carefully "Instructions to Buyers" on page 216

Freight Classification

	Car load Rate	Less than Car load
Anvils	3	5
Area Gratings	3	5
Area Railings	3	5
Balconies	3	5
Bearing Plates	3	5
Boiler Tubes, Black or Galvanized	3	5
Bolts, Screws, Nails, Rivets and Spikes	3	5
Brackets	3	5
Catch Basin Frames and Covers, Cast Iron	3	5
Clean Doors	2	5
Columns, Cast Iron, also Caps and Bases	3	6
Columns, Steel	3	6
Concrete Reinforcement	3	5
Counterweights	3	5
Crestings, Cast Iron	2	5
Derricks, Iron Work for	2	6
Door Guards	2	2
Dump Cars	3	6
Field Stoves	2	5
Fire Brick	4	10
Finials	1	5
Fire Doors, Steel	3	5
Fire Escapes	3	5
Fire Shutters, Steel	3	5
Foundation Bolts	3	5
Fuel Chutes	3	5
Furnace Doors	2	5
Furnace Grates	1	5
Gratings, Cast Iron or Steel	1	5
Highway Bridges	3	6
Hinges	4	5
Hoisting Engines	1	6
Joist Anchors	3	5
Joist Hangers	3	5
Joist Ties	3	5
Kettles, Tanks	1½	4
Ladders	3	5
Letter Copying Presses	1	5
Manhole Covers	3	5
Packer's Equipment	3	5
Pile Caps	2	5
Pile Driver, Iron Work for	3	5
Pile Followers	2	5
Pile Hammer	3	5
Pile Shoes	2	5
Pipe Fittings	4	5
Pipe Railing	3	5

Freight Classification — *Continued*

	Car load Rate	Less than Car load
Post Caps and Bases	1	5
Prismatic Lights, Shipped in Packages; Frames for same shipped separately	3	5
Sash Weights	4	5
Shackles	2	5
Sheaves	2	5
Shutter Hooks and Eyes	1	5
Sidewalk Covers	2	5
Sidewalk Doors	2	5
Skips	2	5
Stacks, Steel	1	3
Stairs, Spiral	3	5
Stairs, Steel	3	5
Stall Guards	1	5
Stall Posts	1	5
Stand Pipes for Buildings	3	5
Stand Pipes, Steel, for Water Supply	3	5
Steel Bars	4	5
Steel Buckets	3	5
Steel Cells	3	5
Steel Floor Plates	3	5
Steel Rails	4	7
Structural Steel, including Separators, Bearing Plates, Beams, Girders, Lintels, Columns	3	6
Tanks, Steel, Special, on Application		
Thresholds	2	5
Fire Rods	2	5
Towers, Steel	3	5
Trusses	3	6
Turnbuckles	2	5
Vaults, Steel, Complete	3	5
Vault Doors	3	5
Wall Hangers	2	5
Wall Plates	2	5
Washers, Cast Iron	3	5
Washers, Steel Pressed or Cut	3	5
Water Pipe Specials. 3-way Tees and Elbows	2	5
Weather Vanes	2	5
Wheel Guards	3	5

Telegraphic Code

Fahrdienst	F. O. B. Destination
Tamelijk	Answer by telegram at once
Afreshing	Answer by first mail with full particulars
Quateron	Full details will follow
Lactariulo	In reply to your letter of
Lacrimavit	Referring to our letter of
Idroscopio	As per your instructions
Icassem	Must have further particulars of
Barajabais	Tenders close for
Scificare	Ship by local freight
Scierons	Ship car load rate
Scideramus	Ship by express
Schutzzelt	How soon can you ship
Sciolvemmo	Have shipment traced
Wachsform	Shipping weight is
Wachaufzug	What is shipping weight of
Sciottates	We can ship in days
Sciotter	We can ship in weeks
Schwebungen	Immediate shipment from stock
Schwingseil	We have shipped
Scipirai	We cannot ship
Sciotteras	Material is ready for shipment
Palrassem	Telegraph lowest price and earliest shipment
Palliolem	What is your price
Tangiras	What are your terms
Oberjager	Have you received the order for
Ecbasi	The extra charge will be
Tapinero	Close at best possible terms
Obliewijf	You may enter order
Obligabais	We have received the order for
Caballejo	Cancel order if not already shipped.
Oberrock	Accept the order
Obliteriez	Cannot execute the order
Taubkorn	Canadian Pacific Railway
Tegens	Grand Trunk Pacific Railway
Taubhliz	Canadian Northern Railway
Barajaban	Tender will be mailed to you
Barajada	Tender has been mailed to you
Barajadlo	Tender will be telegraphed
Palenque	Have not received plans or specifications
Palenses	Cannot tender until we get plans and specifications
Palentino	Cannot tender until we get further information
Baracane	Have date of closing of tender postponed until . .
Seniliter	Our price for the material covered by your list

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INSTRUCTIONS TO BUYERS

BEFORE an order can be accepted or a price quoted it is necessary that we have full information concerning the material or equipment under consideration. What may seem perfectly clear to the purchaser may not be clear at all to us, and to save unnecessary correspondence and delay, full particulars should be given in the first inquiry. For instance, if you are ordering or asking for a price on Steel I-Beams, always state the length wanted, whether compound or single, if web is to be punched for furring strips, and if any other punching or cutting is required. This applies also to Channels, Angles, etc.

If Cast Iron Columns are wanted, always state diameter, thickness of metal, and overall length; also whether caps and bases are to be loose or cast solid with column.

As regards Fire Escapes, Stairs, etc., the information we must have before doing anything with the order or inquiry is clearly outlined in that section of the catalogue covering Fire Escapes, etc., and should be followed closely.

It is always advisable to send in a sketch with the order or inquiry on which should be shown the necessary dimensions.

If architects' plans and specifications are available, copies should be sent to us and our engineers will figure out the different classes of material which we can supply.

Whenever possible the number of the illustration in this catalogue should be given with the other particulars.

As regards shipping instructions, always state just where material is to be shipped to and to whom it will be consigned; also, where the invoice is to be sent.

If it should be necessary to telegraph, use the code words given in this catalogue as far as possible, and the result will be a considerable saving in expense.

Discounts are applicable to all prices given in the catalogue as a rule. We prefer to quote a lump sum price for any material wanted. The prices shown are more for the purpose of giving an idea of the cost than anything else.

As the basic prices of iron and steel constantly vary, it would not be possible to give definite prices which would obtain at all times.

NOTE: All prices given in this catalogue are F.O.B. Winnipeg.

